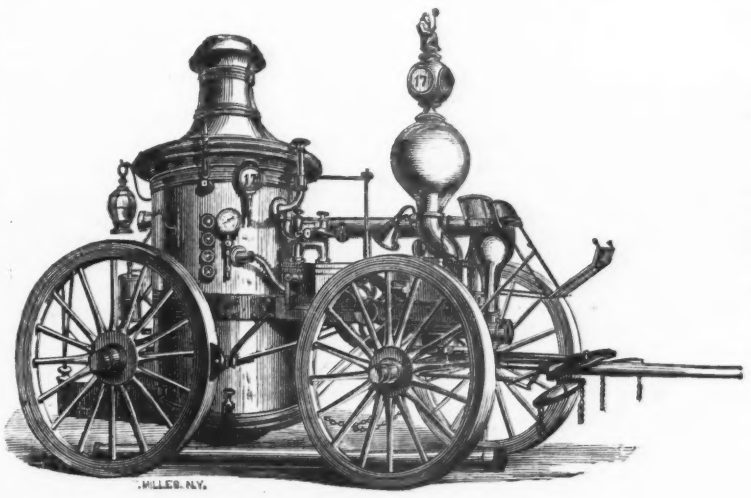
THE ENGINEERING AND MINING JOURNAL.

VOL. VIII.—NO. 22.—THIRD SERIES.] NEW YORK, TUESDAY, NOVEMBER 30, 1869. [SINGLE COPIES 10 CENTS.

Steam Fire Engines.

IT is but a few years since steam fire-engines were introduced into practice; yet, in spite of prejudice and ill-advised "economy," they have made their way to universal recognition, and are now considered indispensable in all large cities. Even smaller towns and villages find it worth while to possess at least one of these effective machines for extinguishing conflagrations. Almost every town, once in its history, has a severe lesson in the shape of a disastrous fire, after which the importance of a water-supply, and of the proper means for applying it where it is needed, is considerably clearer to the most conservative tax-payer. The manufacture of steam fire-engines has become an important business, and large establishments are occupied, in various parts of the country, in supplying the increasing demand for them. The question is no longer, whether such engines are to be recommended in general, but where the best of the class are made. The Allerton Iron Works Manufacturing Company, now located at South Norwalk, Conn., is engaged in this manufacture. Their works, the main building of which is two hundred and fifty feet long, forty feet deep and two stories high, cover about an acre and a half of ground, and employ 275 hands. They produce three classes of engines. The first-class engine weighs 6,500 lbs., and is fitted for four streams; the second class, an illustration of which is given in the accompanying cut, weighs 5,500 lbs., and is fitted for four streams likewise; while the third class weighs 3,500 lbs.. and throws but two streams.

As will be seen from the illustration, these engines are very simple in construction, and not liable to get out of order. It is not necessary to run them with more than fifty pounds of steam; and when they are working at full speed there is but little vibration perceptible. Hence the wheels do not need to be blocked, nor the engine to be "jacked" up, off the springs. The pumps are of simple pattern, and the valves so arranged that they are not choked, or otherwise hindered, in working muddy water. The first and second class engines have two horizontal pump cylinders, respectively 4½ in. and 4 in. bore, by 9 in. stroke; the third class have a single cylinder 4¾ in bore, and 9 in. stroke; but the first and second class engines are fitted with single pumps when desired. Steam can be generated in the boilers, from cold water, in five to six minutes.



THE ALLERTON STEAM FIRE ENGINE.

The Allerton Iron Works Manufacturing Company, South Norwalk, Conn., manufacture these engines, fitted to be drawn by horses or by hand, and with seat for driver, water-tanks, or any other fixtures that may be required, attached. They also make trucks, tenders, hose-carriages, and other articles used by fire-departments, and furnish rubber or leather hose, with or without couplings.

The officers of the Allerton Works are Mr. DUDLEY P. ELY, President of the First National Bank of South Norwalk, and also President of the Allerton Works; to Mr. ELY's ability as a financier is greatly owing the success of the enterprise. JOHN C. STEVENS is Superintendent of the Works which, in point of cleanliness and good order are scarcely surpassed. MR. STEVENS has had long experience as a practical machinist, and the perfection of the details of the engines turned out by this company is greatly to his credit.

The Welsh Slate Trade.

THERE are three principal districts in Wales from which the supplies of slate are mainly obtained, the first and most important being the Bangor district, included in a radius of twenty miles, in which the Penrhyn, Llanberis, Royal Bangor, Prince of Wales, and Nantile veins are worked. These quarries, and others on the same veins, employ about 7,000 men, and produce annually 320,000 tons of slate and slabs. The next in importance are the Festiniog veins, on which are the celebrated Rhiw Brwdir, or Lord Palmerston's quarry, and several others of almost equal importance, belonging to Messrs. Holland, Matthews, Grieves, Casson's, the Diffws Company, and others. These quarries employ about 3,000 men, and produce annually 110,000 tons of slate. A third district includes Machynlleth, Corris, and the quarries working on those and parallel veins, employing about 600 men, and producing 25,000 tons of slate and slabs. Total product of the Bangor veins, 320.000 tons; Festiniog veins, 110,000 tons; Machynlleth, Corris, &c., 25,000 tons=455,000 tons, representing a value of about $5,650,000, gold. Total number of men employed—Bangor district, 7,000; Festiniog, 3,000; Machynlleth, etc., 600=10,000. Allowing each man to earn $250 per annum, which is much in excess of the average, the wages paid in the three districts would amount to $2,650,000, gold, per annum, which, deducted from the value of the product, ($5,650,000), leaves a profit of $3,000,000, or upwards of fifty per cent. on the aggregate value.

Formerly all the Welsh slates were carried in small vessels from the different ports of Carnarvon, Bangor, Port Dinorvic, Port Madoc, and Aberdovey; but now large quantities are sent to different parts of the kingdom by rail; still, the principal traffic is carried on by small trading vessels, many of which go to the Baltic and the Black Sea. The slates chiefly sent to the North of Europe are those from the Festiniog veins, which are selected for shipment to the coldest countries, not because of their peculiar fitness to withstand the vicissitudes of the climate, but mainly, if not solely, on account of their thinness, the freight being charged per ton, and the slates being sold by the thousand. The best material for all purposes is believed to be that on the Bangor range of veins, and nearly all the slates shipped to Australia and the other antipodean regions are from these unrivalled veins. Cargoes of slate generally average below, and not above, 100 tons each. If, therefore, the whole of the product of the districts enumerated were sent by sea, it would require a fleet of 5,000 vessels to carry the whole; or, assuming each vessel to load and discharge a cargo per month, a fleet of 400 vessels would be required to be constantly engaged in this important traffic. A period of from fifty to one hundred weeks will frequently elapse before the orders from slate merchants can be completed, according to the priority of entry on the books of the different quarries, the demand being always largely in excess of the supply.—*London Mining Jour.*

Belgian Primary School System for Miners.

WE are very adverse to taking the instruction and education of the people out of their own hands, and out of those who are working in industrial co-operation with them, and transferring them to a central power and to Government inspectors. We should prefer to see existing systems modified and extended, rather than rooted out; and in our great industrial districts and large manufacturing establishments it seems to us that the principle of Belgian organization might be adopted with good prospect of success. We have taken some pains to get information as to the character of that organization, and we now offer the result to the attention of our readers.

The Belgian Government established some twenty-five years ago institutions termed Caisses de Prèvoyance et de Secours, for the benefit of all its great industries. As, however, those which concern the mining and iron districts are by far the largest and fully developed, it is of these especially that we propose to speak. Each Caisse is formed by a forced contribution of three-quarters per cent. on their salaries or wages, raised by deduction, supplemented by an obligatory contribution equal in total amount from the owners of works, and funds voted yearly either by the Legislature or by the Provincial Council. The funds are devoted to provision for pensions for widows and orphans, to the relief of the sick, then to the development of primary instruction, and lastly, any surplus is appropriated to the maintenance of Industrial Schools. Should there be any deficit, the masters generally do not hesitate to fill up the gap. This, however, seldom occurs, the rule being a large surplus, continually increasing. At Mons, for instance, the Caisse is so flourishing that after the first indispensable contributions to pensions and primary schools, they have an available yearly surplus of upwards of eight thousand francs, which is devoted to the creation of Industrial Schools. The Caisses are administered by a mixed commission of masters and master workmen, under the supervision of the governors of the respective provinces, to whom they have to render accounts annually, in accordance with statutes of organization, approved and certified by the Crown. Several of the great establishments have, in addition, instituted special Caisses of their own in connection and in harmony with the National Caisses. Among these are the Grand Hornée, the Societé Couillet, the Societé Cockerill, and the Societé de la Vieille Montagne. The Societé Anonyme du Couillet have specially instituted a hospital for accidents, attended by Sisters of Mercy, containing fourteen beds. There is also attached to these works an infirmary for consultation, and for dispensing to those who are not bedded, or who prefer treatment at their own dwellings to going into the hospitals. Wives and children are admitted equally with workmen. The medical man is at liberty to call in further advice if he deems it necessary. The Couillet district has a radius of two leagues. The condition of affiliation to the company's Caisse are the same as those of the State, involving a deduction of three-quarters per cent. from their workmen to the State Caisse also. The schools maintained by the Special Caisse are:—

Ecoles Gardiennes, of which the company has two—one at the mine, and the other at their workshops, and in which children of both sexes are received, from three to seven years of age. The school hours are from seven A.M. to four P.M., and at noon each child is supplied with a plate of soup, in which they can soak the bread which they bring with them.

Ecoles Primaires, in which children from seven to thirteen years old are taught reading, writing, grammar, analyses and calculation, *so far as it concerns their calling.* In this school there are 130 boys and 66 girls.

Schools of Apprenticeship, in which the pupils of the primary schools, who wish to devote themselves to mechanical industries, are admitted from thirteen to fourteen years of age, as apprentices in the machine and tool sheds. Their apprenticeship is not long, and as soon as they have sufficient aptitude to give their labor value, they receive proportionate wages. There is, in addition, a drawing school, in which instruction is given three times a week, from seven to nine in the evening; an adult evening school, and a school of music. Some of the great establishments, including, we think, the Societé Couillet, have also instituted building societies with a view of giving the artisans an interest in the locality, and rendering them less nomad in their habits. In this system two remarkable and distinctive facts present themselves. The first is, that the artisans neither have instruction tendered to them as a charity, nor forced upon them by hard influences, direct or indirect. They assist in the creation of the means themselves, and co-operate in their administration. The second is that masters and men enter upon the undertaking on a footing of perfect equality, the fact of the one paying and the other receiving wages not entering in any way into the dealing with the question.

There is another circumstance worthy of remark—namely, that the Belgian system universally recognizes a fact which we have been disposed, it seems to us, rather to ignore—that there is much education in work. We do not see that there can be any difficulties except such as might be overcome in the way of applying these principles and this system to our own great towns and centres of industry. We believe their adoption would entirely get out of the supposed necessity for compulsory enactments in regard to education. We believe, if the working men were taken into council and co-operative action, and if facts made it evident to them that harvest would come after the sowing, and that the seed would pretty surely bear fruit, that there would be no want of readiness among the majority of them to send their children to school. Hitherto there has been no such inducement. The scholastic instruction of the State has had very little evident influence on a boy's future career, because we have not been careful to teach him the things that specially concerned it, but have left it to his instructors to cram into him the knowledge of men of their own class, that class not being his class. And while we have erred as to the substance of the instruction, we have been equally mistaken, as far as we have been able to form an opinion on the matter, in stimulating memory even to the point of wearing it out, and actually creating a bar to thinking by clogging the mind with bare facts. That is the conclusion which inquiry has forced upon us, and, what is far more important, we believe it to be the conclusion to which the working-men them-

selves have largely come. The following statements of the accounts of ten Caisses of the mining districts will give an idea of the largeness of the sums which the system renders available: The receipts of the Caisses of Mons. Charleroi, si Centre Liège, Namur, Luxumbourg, were, in 1865, 2,370,666f. 42c.; the expenditure, 2,079,048f. 43c..; and their reserve on the first of January, 1866, amounted to 64,385,297f. 84c.—*London Colliery Guardian.*

Notes from Southwestern Virginia.

BY A. EILERS, MINING ENGINEER.

II.—THE UNION LEAD AND ZINC MINES OF WYTHE COUNTY.

These mines are situate in Wythe county, Va., twelve miles south of Max Meadow station, in that large bend of the New River, where this stream, after breaking through the Iron mountains in a northwestern direction, takes a sudden northeast course, and flows thenceforth, for a long distance, parallel to the mountain chain. The mines are very old. Originally discovered by a Mr. CHISEL, they have passed for more than one hundred years through all those stages of eternally changing prosperity and apparently utter failure, to which the best mine can be brought by irregular mining, litigation, and indifferent management. Since the last twenty-five years, however, much of this has been done away with, mainly through the untiring energy and good judgment of Mr. WILLIAM KOHLER, the able superintendent. The mines have prospered, paying a heavy yearly dividend to the stockholders; and to-day they are in as good a condition, and offer as flattering prospects for the future, as they did before an ounce of mineral was removed from the deposits. Perhaps a more cautious and provident and less greedy company would not prevent their superintendent from doing more dead work ahead, so as to be *always certain* of a sufficient supply of ore; perhaps such a company would also be able to see and act accordingly, that it is far cheaper to drain a system of mines by means of *one* deep adit, and to transport the ores through it to the dressing works (especially when the completion of such an adit lacks only about fifty yards driving to connect with the principal shaft,) than to hoist both water and ore several hundred feet, and then haul the latter a long way over a rough hill to the tramway, by which it finally reaches the river. But a really good and rich mine can stand a great deal; and the mismanagement on the part of the company, which would break any other lead mine in the United States, serves here only to show more conspicuously the high value of the mineral deposit.

The mode of occurrence of these lead and zinc "veins" is geologically interesting, and the bountiful concentration of so much mineral on one property perhaps unique. It will be remembered, from the preceding article, that in the dolomite near New River, a steep anticlinal occasions the strata to dip first southeast, then northwest. This fold runs through the Union Lead Mining Company's property; and on the crest and both slopes of it the mineral deposits are found. Furthermore, it must be mentioned that, besides the real dip of the strata, there is also a dip of the back of this anticlinal, so that towards the northeast, near New River, it sinks, while towards the southeast it rises rapidly. Between the strata on this anticlinal, and parallel to their dip and strike, occur three distinct layers of lead and zinc ores, making, apparently, six distinct "veins," of which three dip to the southwest and three to the northwest. Five of these have been and are now being worked; the sixth, or extreme northwest one, runs for the most part in the bed of New River, and in the flat bottom adjoining it, and proves only its existence by the outcrop of a short ledge of dolomite filled with lead and zinc ore on the river bank near the ferry, Owing to the gradual sinking of the back of the anticlinal towards the northeast, the mineral layers approach each other laterally in that direction, while towards the southwest they spread fan-like. The solid back of the anticlinal has been reached by a tunnel driven from the foot of the hill, near the company's shore towards the southwest; and the two middle layers have been extensively worked here by upward stopings. Numerous shafts, some of them connected by galleries, have been sunk on the top of the hill on the different layers. None of these, however, connect either with the tunnel above mentioned, or with a main draining tunnel commenced by Mr. KOHLER during the war, and driven from the northwest in the neighborhood of the dressing and smelting works, obliquely across the strata to within fifty yards of the main shaft on the hill. Here Mr. KOHLER was stopped by the provident directors of the company, who needed all hands to furnish more lead to the Confederate Government. Nothing has since been done to the adit.

The two middle layers are the most important, on account of their thickness as well as the rich quality of the ore. They vary from five to twenty feet in width, and carry galena, carbonate, phosphate and sulphate of lead, and carbonate silicate and sulphuret of zinc, very evenly distributed. The zinc ores occupy the lowest position, (the footwall, one might say, if there were any walls at all) the lead ores the upper; they are rather sharply separated, so that it is an easy matter to mine each kind for itself and do the principal part of the dressing in the mine. To the depth of thirty to sixty, sometimes even a hundred, feet from the surface, the mineral-bearing layers are entirely decomposed, so that hitherto very little blasting has been necessary for the mining of the richest ores. They lie here in a matrix of red calcareous clay, and consist mainly of carbonates of lead, clustering around solid lumps of undecomposed galena, and carbonate and silicate of zinc. The latter have been, up to within a few years, thrown on the dump as useless "rock"; but are now mined and sold to Northern zinc works. In the deeper workings, the sulphurets of lead and zinc occur mainly distributed through solid dolomite, so that these ores have to be crushed and dressed before smelting. The harder portions of the upper workings, where combs and sheets of dolomite filled with lead occur frequently, undergo the same process. Beautiful crystals are often found.

The dressing works of the company are situated at the river, which furnishes plenty of motive power. They consist simply of Cornish crushers, sluice-boxes and jiggers, and are fully sufficient for the kind of ores they are intended to work; since the deads to be got rid of are almost nothing but dolomite, zincblende and very little quartz. Only this circumstance renders it possible to furnish so high a grade of washed lead ore (sixty-five per cent.) as is actually produced, without even sizing the crushed ore by running it through sieves before jigging and washing. The zincblende, which is lost at present, is actually not worth an extra treatment, so long as thousands of tons of silicate and carbonate of zinc can be picked up on the very surface of the property and on all the dumps.

The smelting works consist of a reverberatory roasting furnace, a Scotch hearth and a low slag-furnace. The necessary wind for the two latter is furnished by a wooden and rather poorly constructed cylinder-blast. Most of the lead is shipped in the shape of pigs; a small part of it is converted into shot at the mines. One of the old shafts is used instead of a shot-tower. There is very little silver, only about six ounces to the ton of two thousand pounds, in the lead, and it is therefore not extracted.

The yearly production of the mines is very large. Exact figures are, however, not at my disposal at present. I can only say, that the works employ over one hundred men and boys at very low wages, from $6 to $26 per month, that the charcoal used costs only seven cents per bushel, and that the economical management of an able and competent superintendent has succeeded in securing regular yearly dividends of from $30,000 to $45,000.

The described property is not the only one in this neighborhood on which lead and zinc ores are found. On the contrary, some of these layers can be traced for more than fifteen miles, and the zinc ores especially are very abundant in numerous localities. But nowhere do all the layers occur under such happy combinations, and concentrated on one property, as they do on the one under discussion. I even doubt whether there is a second locality to be found in the United States equally favored in these respects.

III.—IRON ORES AND IRON WORKS.

Over the whole extent of the Silurian limestone formation of this region, and for the most part along the contact lines of blue limestone and dolomite, or between blue limestone and red slates, are found more or less extensive deposits of iron ores. They are mostly limonites, and invariably products of decomposition. Some of them are of great extent—laterally as well as longitudinally—and they are generally from thirty to a hundred feet deep. Nearest to the surface the ores are always free from sulphur. At a depth of from twenty to forty feet, however, undecomposed sulphurets of iron make their appearance inside of the larger lumps of ore. At still greater depth, varying according to the permeability of the strata, solid iron pyrites is found. The iron ores are usually very free from gangue, and the adhering red clay is the only impurity to be removed by washing. Owing to the origin of the ores, they all require a thorough roasting and subsequent assorting, in order to remove the solutive water, and as much of the sulphur as possible. The principal localities in the neighborhood, where these ores are mined and smelted, are all along Cripple creek, an affluent of New river, GRAHAM'S works on Reed creek, and the Stratford Iron Company's works on Max creek. With the exception of the latter company's furnace, all the works use charcoal and the coal blast, and make an excellent mottled pig-iron. The works of the Stratford Iron Company, lately built by Northern capitalists, use the hot blast; but hitherto, although they have doubled the daily product, have not succeeded in producing a uniform quality of iron.

The different works along Cripple creek all labor under the disadvantage of using too high-priced charcoal, in consequence of their being situated in a farming country, where most of the wood has been removed, and also because the land belonging to the works covers usually too small an area to enable them to produce their own coal for any length of time. Failures and change of proprietors are consequently frequent. GRAHAM'S works, and the Max creek property, are situated near the Poplar Camp mountains, and extensive tracts of woodland on the mountain will furnish them a large amount of cheap fuel for many years to come. Ultimately, however, all these works will have to draw on the coal-formation, some twelve or fifteen miles north-west of them, for their supply of fuel.

GRAHAM'S works consist of two cold-blast furnaces, one near his house, on a small stream, which furnishes the power for his wooden cylinder-blast, the other on the southern bank of New river, some three miles from the former. A small establishment for the conversion of a portion of the pig-metal into wrought iron, a foundry and rolling-mill are situated on Reed creek. The yearly product of these works is not large. The blast furnaces run alternately during the summer of every year, and produce from three hundred to five hundred tons of a superior iron. Some of this iron is shipped east, but a great part of it is converted during the winter into castings, wrought iron and nails for the use of the neighborhood. The wrought iron is far better than most of the northern iron, and is principally used for farming purposes. The supply of ore on the property will be, at the rate of the present consumption, sufficient for hundreds of years.

The Stratford Iron Company's lands and works are situated on Max creek, close to the foot of Poplar Camp mountain, and only twelve miles from Dublin depot. The property is underlain partly by Potsdam sandstone and partly by the adjoining slates, limestones and dolomites. There are very extensive deposits of limonite on the last mentioned portion of the estate, and the company has erected substantial works to beneficiate these ores. The furnace has a diameter of fifteen feet at the bosh, and is over forty feet high. An engine, much too large for the present extent of the works, drives the cylinder-blast. The air is heated by passing through a system of iron pipes at the top. From these it passes into a large receiver, and finally, under heavy pressure, into the furnace. The steam necessary for the driving of the blast is generated by the waste gases from the tunnel-head. The product of the furnace is said to be eight tons per day, which is not as much as it should be, considering the kind of ore used and the size of the furnace. The resulting iron is of very uneven quality, and mostly white, undoubtedly in consequence of the extremely bad and negligent roasting and sorting which the ores receive before smelting. It is reported that the company intend to increase their works in the spring. None of the iron works built in this region are able to do justice to the enormous supply of ores. The principal hindrance in this direction is the present poverty of the South. Since, however, the attention of northern, and especially Pennsylvania, capitalists has been drawn to this neighborhood, the prospect for the conversion of these natural stores of raw material into merchantable forms, to be added to the wealth of the country, has grown much brighter.

The Chemistry of the Mine.

IN a recent lecture before the Dudley Institute of Mining Engineers, Dr. HILL gave the following very lucid and interesting *exposé* of the origin and mode of action of fire-damp. Although there is nothing very original about the lecture, still the clear and forcible manner in which the subject is presented under the doctor's remarks, is worthy of preservation.

Light, carburetted hydrogen, or fire-damp, proceeds, like marsh gas—which is, indeed, the same substance—from vegetable matter decaying in damp places; all coal consisting of vegetable matter. For experimental purposes, the gas might be obtained from a salt of acetic acid. When burned, it produced carbonic acid and water. The combustion of carburetted hydrogen is a safe and simple process when it is effected gradually; in fact, it forms about 40 per cent. of common coal gas; but if a mixture of carburetted hydrogen and oxygen be inflamed, they suddenly unite with a loud and violent explosion, the force of which is equal to a pressure of 555 pounds on the square inch. A similar result follows the application of a light to a mixture of the gas with air, because air contains oxygen; but in consequence of the oxygen in the air being diluted with inert nitrogen, the explosion is more feeble than when the fire-damp is mixed with pure oxygen. But though this explosion is comparatively weak, it is absolutely very powerful, being calculated to exert a pressure of 210 pounds on the square inch, which is amply sufficient to account for the destructive violence of coal-mine explosions. Fire-damp, then, explodes when mixed with either oxygen or air, and a light is applied; but it does not do so in all proportions. The most favorable proportion for explosion is one volume of fire-damp to eight or ten of air; but when the volume of air is very small or very great, no explosion takes place. When the air amounts to seventeen times the volume of the gas, there is no explosion or if it is less than four times the volume of the gas, the mixture is equally harmless. Fire-damp (light carburetted hydrogen) is very light compared with air, and it therefore occupies the highest place in mine workings; and it may therefore be lighted without danger, provided the quantity is very small. He had heard of workings where a lighted candle held for a moment near the roof would produce a slight explosion, but by holding it near the floor, it would be extinguished; the extinction being caused by carbonic acid gas, which occupies the lowest place, because it is heavier than air. The temperature requisite to ignite inflammable gases differs very much, and fire-damp requires a higher temperature than most others. This is a very favorable circumstance in connection with the construction of the safety-lamps, and this accounts for the fact that, in making very urgent explorations in an explosive mixture of the gas, the Davy lamp may continue to be used when red hot, but this, of course, should only be done under the most urgent necessity, as, for instance, the rescuing of life when in imminent danger. A red hot solid body will not inflame a mixture of fire-damp and oxygen. Flame will ignite it, but even flame must be allowed to remain in contact with the mixed gases a certain time in order to heat them to a certain point, or else no explosion will occur. The original safety-lamp of STEPHENSON was constructed in accordance with these facts. The flame was surrounded by a tall chimney, the rapid draught through which did not allow the combustible mixture to remain long enough in contact with the flame to become heated as high as the point of ignition. Sir HUMPHREY DAVY acted upon a different principle in the construction of his safety-lamp. Flame is extinguished when its temperature is lowered to a certain extent. In blowing out a candle, the extinction is produced principally by the excessive supply of air cooling the flame below the temperature at which it can burn. Coals are readily extinguished if taken from a fire and placed separately on good conductors, such as iron, etc., and it was upon this property of metals as good conductors that DAVY relied in the construction of his lamp. That metals are good conductors may be easily demonstrated. If one end of a rod of metal be heated, the other end soon becomes hot. The heat is conducted along the bar. Now, if heat be conducted along the bar, the bar must first receive the heat from something which to that extent must be cooled. If, instead of using a bar, a coil of metal be placed over the flame of a candle, the flame will not burn inside the coil, though there is plenty of room. If the coil be depressed until it surrounds the wick, the flame will be extinguished; the heat necessary for its existence being carried away by the wire. That the extinction of the candle flame is due to the cooling effect of the copper is seen by making the copper very hot, when it will no longer extin-

guish the flame. A round tube of copper would answer the purpose as well as the round coil; a square tube would answer equally well, and the longer the tube the better it would conduct. Practically, a very large number of very short tubes of exceedingly small diameter are as effective as longer tubes of greater diameter; hence the value of "wire gauze." The smaller the tubes the better the conducting surface; 700 or 800 meshes in the square inch answer very well, but a gauze having 28 divisions to the square inch each way, or 984 meshes to the square inch, is considered to be a proper standard. If such a piece of gauze be depressed on a gas flame it nearly extinguishes it, and the flame will not pass through it; or, if the unlighted gas be allowed to pass through it, the gas may be lighted above the gauze without the flame communicating with the part of the jet which is beneath the gauze. Even burning spirit, when poured upon the gauze, will be extinguished, the spirit passing through, and the flame being unable to accompany it. Upon the simple principle illustrated by these facts, DAVY constructed his lamp, which was nothing more than an oil lamp surrounded with a cage of iron wire gauze. In speaking of the beautiful simplicity of the Davy lamp, a previous writer has said, "Here may be seen the enemy in harmless corruscations, shorn of its strength, imprisoned in a slender cage, which the wand of science has encircled around the angel of death." When this lamp burns in a mixture of fire-damp and air, the mixture passes into the lamp and burns there, but the flame cannot pass out of the cage to ignite the explosive atmosphere in the pit. If the lamp be introduced into a vessel of air representing a pit, it continues to burn as usual; but if coal gas—representing fire-damp—be admitted, the flame of the lamp lengthens and flickers, and will at last be extinguished, while the explosive mixture of fire-damp and air continues to burn within the cage. When this appearance occurs in the working, the miners should at once accept the simple but infallible warning and withdraw, because in time the wire gauze will become so hot as to ignite the external fire-damp, and cause the very accident which it is its function to prevent. Miners object to the use of the lamp because it gives little light, but there are many modifications of the lamp by which this defect is obviated, principally by the introduction of glasses into the cage in front of or around the flame. Naked flames ought never to be used in testing the presence of gas, or in pits where large quantities of gas are thrown off, because it is impossible to say when a "blower" may be opened by a miner's pick. Here the learned lecturer described the rude means for getting rid of the gas in pits before the invention of the Davy lamp. This, he said, was done by an old firing line. Some fool-hardy workman was engaged to shut himself up in the mine in a recess or box made for the purpose, having a small communication with the down-cast shaft, by which he could get pure air, and then, by aid of a lighted candle drawn with a line over a pulley to the roof of the mine, explode the gas, and get rid of it by these means, often doing great destruction to both life and property. This rude method was followed by the old steel mill, one of which was exhibited, and seemed very much to amuse the audience. Light from this instrument was produced by turning a plain disc by means of cog-wheels, against which was held a piece of flint, throwing off a stream of sparks, by which feeble means the coal hewer was enabled to see or rather feel his way.

These sparks are said to lead to explosions, and the immortal DAVY, after laborious research, invented the present Davy lamp in 1815, the greatest boon the coal miner ever had. The ventilation of mines is a matter of great importance. Even at the surface of the earth, where every habitable spot is comparatively open to the operations of diffusion and dispersion by winds and currents, houses, etc., may become so foul as to be unfit to support healthy respiration; but in a mine, where there is communication with the air by only one, or at most two, narrow long openings, the difficulty of obtaining a plentiful supply of pure air is, of course, much greater. The effect upon air of its being breathed is very remarkable. Taking a jarful of air, for example, it readily supports the combustion of a taper; but let a portion of this air be breathed, and the candle no longer burns in it. Air that has been breathed is as unfit to support life as it is to support the combustion of a candle. Indeed, the animal organism is even more susceptible than the candle is of the effects of air charged with carbonic acid gas. Of all general causes of disease, impure air is the most common and the most dangerous. The effect of burning candles, lamps, etc., is the same as that of breathing. A taper will burn only for a short time under a bell-jar. A room containing six persons, and illuminated by six gaslights, has its air vitiated as much as if it contained nine persons. In mines it is absolutely necessary that there should be two separate passages for the incoming fresh air and the outgoing impure air. If an open lamp chimney be placed with its lower end resting on the table over a burning candle, the flame will be very soon extinguished; but if the chimney be raised a little from the table, the candle continues to burn; because, in the latter case, there are two openings, one for incoming fresh air, the other for outgoing impure air; while, in the former case there is only one opening. Having further described the proper means of ventilating mines, Dr. Hill made some remarks upon spontaneous combustion. He said that the sulphur in coal does not cause spontaneous combustion; on the contrary, the coals which contain the smallest quantity of sulphur are most frequently the subjects of spontaneous combustion. By sulphur he meant sulphide of iron, and not gas. He had learnt that the carburretted hydrogen of the mine was locally called "sulphur." That was a misnomer, and should be disused, and the term gas used instead. In conclusion, with reference to persons suffering from partial suffocation, the lecturer strongly ridiculed the old notion of placing the sufferer's head in a hole, from which a turf or sod had been previously cut, and the turf placed on the back of the patient's head. Instead of which, he recommended plenty of fresh air, stimulants, and artificial respiration. He strongly deprecated a heavy, hot, mid-day meal, and a large quantity of beer in the pit, suggesting that that meal should be taken at the close of the day's work at home, as being much better. The lecturer then gave some good general advice as to the personal habits of the miner, both in and out of the mine, and hoped that the course of lectures which he had the pleasure of giving might be both of immediate and ultimate benefit to the large and important class of persons constituting the mining population.

The Lehigh Coal Company.

WE extract from the Report of the Board of Managers of the Lehigh Coal and Navigation Company, the latter part of the report of Mr. R. P. ROTHWELL to that company, which contains suggestions of general interest and value. After a description of the property, Mr. R. remarks that there is an average thickness of good coal in the several beds as follows:

	THICKNESS GOOD COAL.	SURFACE AREA UNDERLAID.	VEIN AREA.
G,.....	5 feet.	2.000	2,500 acres.
F,.....	8 "	4.000	5.500 "
E,.....	19½ "	5.500	7.500 "
B,.....	5 "	6.600	8.500 "
All other veins....	5 "	on an area of	5.000 "
Total.....	42½ feet.		

Our investigations have also shown us that, from the undulations in the beds, the actual amount of vein area is as given above, allowing liberally for outcrop waste and other contingencies. The amount of coal obtained from these figures amounts to the enormous total of 445,000,000 cubic yards, or 472,000,000 tons, assuming the cubic yard of this coal to weigh 2,600 pounds. The anthracite from this property has been found to possess a specific gravity of 1.55 to 1.60, or is heavier and harder than the coal from any other part of the State.

We have already given the area underlaid by the lowest coal-bed as 6,784 acres; by the E coal-bed as 5,656 acres. But, making allowance for waste along the outcrop, we obtain, as the effective coal areas respectively, 6,600 and 5,500 acres, etc., as given above; and 472,000,000 tons on an area of 6,600 acres gives a vertical thickness of nearly forty-two feet, and each acre yields 71,500 tons of coal.

Calculating from the mine plans, and other data, we find the area of beds worked over yields 33,609,000 cubic yards, or 39,000,000 tons, or only eight and a quarter per cent. of the total coal originally on the property; but, since only 11,868,291 tons were sent to market from the company's mines, it follows that only thirty and a half per cent., or less than one-third of the coal worked over was made available. This, however, includes pillars and reserves now being worked, which may bring this up to thirty-three per cent.

We shall notice presently the cause of this enormous waste. The E vein contains the majority of all the coal on the property, entering into the total amount for 273,870,000 tons; but it has also supplied by far the greatest part of the coal sent to market. The workings on it represent 31,947,221 tons; yet so enormous is the amount of coal contained in this bed, that even these figures represent but eleven and one-third per cent. of the bed; while the total amount of coal sent to market would represent scarcely more than three and one-half per cent. of the coal contained in this one bed. As above noticed, the actual amount of waste or loss in mining and preparing the coal has been two-thirds of the whole. It is to be hoped that before many years have passed this loss will be greatly diminished. Allowing it to amount to one-third, there would still remain 161,281,853 tons tobe obtained from the E bed alone, and from all the beds 282,000,000 tons—an amount which should satisfy the most desponding as to the permanency and value of the mining capabilities of this property.

The value of a coal property is not measured alone by the quantity of coal it contains, but is influenced by a variety of conditions, such as the thickness of the beds, their depth below the surface, whether they can be mined above water-level by tunnels, or below by shafts and slopes. The nature of the coal, the presence or absence of fire-damp, and of large quantities of water—in short, the value of a property is determined by the amount of coal we can get from it, not the amount it contains.

The Lehigh Coal and Navigation Company's property contains, as we have stated, 423,000,000 tons; but if we can get but one-third of this, then the value is to be estimated accordingly. Nor is this all. The coal in the tunnels and other openings near the surface is worth twice as much as that in the deep basins. You can get a royalty of fifty cents (let us say) per ton in your present openings; but can you get twenty-five cents per ton for the coal in the centre of the basin, where expensive shafts and machinery will have to be establised for getting it? If we credit every ton of coal sent to market with the value of the *two tons* wasted in getting it,—and that is the amount by which the value of the property is depreciated,—the question of economy in mining cannot fail to attract that attention which it deserves, but which it has not, up to the present time, received in this country.

In view of the fact that in Europe—for example, at the anthracite mines near Grenoble (Isère), at Blanzy and Le Creusot, in the centre of France, and in Germany—coal-beds, fully equalling our ownin size and steepness of pitch, are worked with an amount of waste not exceeding ten to fifteen per cent. (where formerly, when the system of mining we are now using was practiced, the waste amounted to two-thirds, as with us), it is a standing reproach to us that no attempt has been made in our anthracite mines to improve the system adopted thirty years ago. Yet it is neither the spirit of this age, nor the genius of our people, to admit that we cannot do what others have done before us.

The system of mining introduced and adopted in our anthracite mines thirty years ago is still practiced universally. It is known as the breast and pillar method, and consists in working out the coal in chambers or breasts, and leaving pillars of coal standing between these to support the roof, or overlying rocks. These pillars are usually left one-half as wide as the chambers If these latter are ten yards wide, the former are five yards. Except where the roof is very good, but little is ever taken from these in after-operations of "robbing." In pitching seams, such as we have on the Lehigh Company's property, the chambers—opened as shown on the accompanying etching—are kept full of coal—the miner standing on this loose coal in blasting down at the upper end or face of his breast. When the coal is slippy, or subject to faults, it will often commence running in these chambers, which are from that time inaccessible. Coal is drawn out from the bottom as long as it will run; but whether one-half or one-tenth of the coal above the breast and in the pillars has run down, there is no means of determining. Large pieces of coal are thus abandoned, and they, as well as the coal in the pillars, become lost beyond hope of recovery. Besides this source of waste, there is another almost, if not quite, as important. Our large coal-beds are composed of a series of benches or layers of coal and slate. One or more of these benches of coal is often abandoned entirely, either because the coal may not be as hard or as bright as some other benches of the vein, or because the slate dividing the benches of coal may become difficult to break down, or for some other such cause. Such bed or beds can never afterwards be worked economically, and in many places not at all. The total waste is therefore fully fifty per cent.

The French and German systems of mining, referred to above, consist in mining out the entire thickness of the bed in sections, no pillars being left standing, but the roof allowed to fall back of the work, or it is supported by packing or filling (remblais) of slate, earth, etc., in part sent from the surface, and in part separated from the coal in the process of mining. This method, expensive as it might at first sight appear, has, within the last ten or fifteen years, entirely supplanted every other method of mining in the thick coals of the centre of France, and it has been attended by the most satisfactory results, both as regards economy in cost of getting the coal, and in the safety it affords the miner, besides the important saving in the coal itself.

In mining, the peculiarities of every location must be carefully studied before deciding on the system of mining to be adopted; hence, doubtless, the French method (which is now meeting with great success in the thick coals in England, having been introduced there within comparatively few years), would have to be modified somewhat to suit the conditions of our mines, cost of labor, etc. But there can be no doubt that some such method introduced in a skillful manner, and systematically executed, would be greatly to the benefit of our mine owners. Certain it is, we cannot long continue to work our mines in the present disgracefully wasteful manner. We are now sowing the seeds which in a few years will yield a fruitful harvest of trouble and expense. We are wasting throughout the anthracite region from one-third to two-thirds of our coal where it is cheaply and easily mined; and even now the supply above water-level, which should have lasted for many years to come, is rapidly giving out, and every year will increase the difficulties and the expense of mining. That the amount of coal yet in this property is enormous, and sufficient to ensure a supply for probably one hundred years to come, is no reason for allowing the most valuable portion of these coal-beds to be wasted, and thus not only depreciating the value of the property itself, but, by diminishing the supply of anthracite, and consequently increasing its price, we are endangering those industries on which the very foundations of our national greatness and prosperity repose.

The substitution of one system of mining for another cannot be made in a month or a year, it is a subject requiring the most careful and patient study. The men have to be educated for a kind of work with which they are not familiar; and those who have had to do with miners, alone know their prejudices in favor of "what is" and "what they have been accustomed to." The custom so general throughout our anthracite coal-fields, of having the coal mined by lessees on short leases, has had a most disastrous effect upon good mining. The lessee's interest is to obtain the greatest amount of coal possible during the term of his lease. He pays, in general, but little attention to the future value of the property. Where the coal is difficult to get, it is frequently abandoned in such a way that it can never afterwards be mined, and in general little or no attention is paid to carrying on the work in that systematic manner which alone can insure permanency of supply in the at-best uncertain operations of mining. The large companies owning the mines which they work have the most direct interest in introducing greater economy in their system of mining and in the preparation of the coal; and there are few properties, within my knowledge, where there is a greater need of improvement than in that belonging to the Lehigh Coal and Navigation Company.

Unquestionably, the Panther Creek property presents difficulties such as are seldom met with in coal mining. These are partly owing to the enormous thickness of the beds, and also to their high inclinations, and to the complicated system of flexures which affect the measures of that part of the coal-field. Every year the difficulties encountered in pumping, ventilating, hoisting, etc., must increase. There is consequently the greater need for economizing the coal where it is easiest obtained, and at the least expense.

That the Lehigh Company possesses one of the most magnificent coal properties in the world, cannot be questioned, and that the quantity of coal is such as to allay all apprehension for an abundant supply far into the future, is undoubted; yet the question of economical mining and preparation is to the full extent as important to the company as the possession of acres;

and it needs no apology on my part for occupying so much space with what may appear a subject beyond the limits of my instructions, and which might be considered as coming within the jurisdiction of your mining engineer.

The Law of Wages.

THE relations between labor and capital are not so simple as those appear to suppose who attempt to regulate them on the basis of mere mutual hostility. Much complication is caused by the fact that every laborer is also a capitalist, and every capitalist also a laborer; indeed, that capital itself is nothing more than labor—the surplus of yesterday's labor over yesterday's needs. The mechanic who receives at the end of the week his wages from his employer, is himself an employer of the butcher, the grocer, and the newspaper publisher; while the proprietor of a factory, who pays off his hands to-day, is to-morrow himself paid off by *his* employer—the public. In all this intertwining of private and general interests, arbitrary regulation of wages is, for the shortest time, mischievous; and, for longer periods, impossible. It is, for instance, the private interest of the manufacturer to have his wares dear; but it is his interest, as one of the great public, to have all wares cheap; and the artificial enhancement of the price of one article inevitably raises the cost of all. How shall this opposition of interests be reconciled? Is there any natural law of recompense, which, *if let alone*, will produce an equilibrium? We think there is such a law; and we believe it to consist in the natural proposition that all labor is not alike valuable; and that labor acquires value precisely in proportion as it involves the element of mind. It is this element, controlling and developing the bodily powers, that produces skill and originality of workmanship. The artificial regulations which interfere with its full effect are mischievous. There are, however, some causes which, for a time, operate to disturb the classification of labor according to the degree of mind it involves, and concerning which the opinions of economists differ. The labor of an inventor, for instance, may or may not be highly intellectual. Many a man has made his fortune out of some patent toy or simple contrivance, the device of which cost scarcely any mental exertion, but was the result of a "happy thought." In such cases the high remuneration received is due to the creation of an artificial monopoly by the patent law. Complicated inventions, like power-looms, type-setting machines, etc., neither profit so much from the patent laws, nor need those laws so much for their protection. The skill involved in designing and constructing them is itself a protection. Hence, many thoughtful men consider the general effect of patent laws hurtful to industry, because they almost always fail to reward the most meritorious inventor, while they enrich the charlatan. GOODYEAR struggles almost hopelessly with poverty and discouragement for years, while the man who invents the "dancing nigger" retires rich in six months. There is much to be said on both sides of the patent question. The opponents of the system propose in its place a bounty, to be awarded by Government, to the originators of really important discoveries or improvements, according to the degree of their value. But it would not be difficult to point out serious evils attendant upon this plan. Meanwhile, the patent laws, though they do not act equally in their bestowal of rewards, are at least a perpetual incitement to every man to busy his thoughts, as well as his fingers, with the work he has to do; to leave his art, however rude and homely it may be, better for some device of his than he found it.

Another disturber of wages is the oft-quoted law of supply and demand. The laborer in a given department finds that department overcrowded, and cannot receive the wages he deserves. This is frequently the case with literary men; though, we must confess, we have seldom known a trained and thorough workman in literature to fail of profitable employment. The ranks of starving authorship are kept full by those who turn to the pen, with no better preparation than failure at every other weapon. And this is the case also with those other overnumerous and underpaid workers, teachers and sewing-women. Again, unnatural scarcity or abundance may be produced by speculation, or by injurious tariffs, and thus the law of wages may be hindered from operation. But it exists all the same; just as the law of gravity is not suspended because an object is arrested in its fall. The world of labor is like a sea lashed with winds and heaving with tides; and the law of wages is like gravity, which, if it could act undisturbed, would bring about a perfect rest and calm, and which is palpably felt, working to that end, in spite of all the turbulence of tidal waves or passing storms.

In deciding, then, what artificial restraint or assistance may properly be applied to this or that industry, we should bear in mind that every interference with the natural law of wages is an evil, though it may be the only means of escaping a greater evil. Patent laws, tariffs, protective unions of capital or labor, are all to be defended on the ground of the greater good to be secured by them at the cost of a certain amount of evil. Their value is, therefore, to be constantly weighed, since at any time they may be so misused as to bring the balance of evil on the wrong side. When the Miners' League, at Grass Valley, for instance, demanded that the ordinary laborers employed in sorting, breaking and wheeling rock on the surface should receive the same wages as the skilled miners underground, it abolished the distinction existing in nature between the two classes of work, and ignored the greater skill—that is, the greater exercise of mind—required to grapple with the peculiar difficulties and dangers of underground work. The natural result of such a step would be to discourage all workmen from taking the pains to become skillful. In fact, every labor union which attempts to maintain rates of wages without reference to the kind of labor and the degrees of skill, is exceeding its true and wholesome sphere of activity, and becoming a positive curse to the workingman. If it is only necessary for a man to belong to a certain association of fellow-craftsmen to obtain maximum wages, whether he be dextrous, faithful, and ingenious, or the contrary, then what is the use of acquiring those qualities? The labor union, thus maladministered, becomes a mere harness, by means of which the ignorant, shiftless, and lazy are appended, as so many dead-weights, to the active, industrious, and thoughtful. It hinders a workman of talent and application from gradually advancing to the position of an employer. It were far better to make the place of the laboring man, if need be, a little less comfortable, but to leave him at the same time the motive and the opportunity to lift himself out of it.

These attempts to sell labor by the quantity, without reference to quality—to make the worm-eaten apples count in making up the bushel—will certainly be, in the end, unsuccessful, because they are, at the foundation, dishonest.—*Manufacturer and Builder for November.*

MINING SUMMARY.

Nevada.

THE COMSTOCK.

The Gold Hill *News*, November 13th, thus reviews mining on the Comstock lode: "There is every reason to believe that the old Comstock is about entering upon a very prosperous season, and the completion of the railroad from Carson to this point is simply another very good reason for believing so. The faces of stock dealers are considerably more cheerful under the present state of prices and future prospects than they were two or three weeks ago. The following record of the lowest prices, per share, of our leading stocks during the past season, will do very well to compare with the prices of the present time: **Savage, $33; Hale & Norcross, $90; Gould & Curry, $65; Chollar, $13; Kentuck, $132; Yellow Jacket, $31; Crown Point; $11; Imperial, $27; Empire Mill, $12.**

"SIERRA NEVADA.—The rich vein of white ore developed in the drift 50 feet below the car-track level still looks well. It is some ten or twelve feet wide, and has been drifted out to the extent of 65 feet, and above this, one set of timbers, the ore still continuing above that to an unknown extent. The north end of the vein does not improve, but below the floor of this level it holds out good future promise. The main winze has been continued 50 feet deeper, and a drift from the bottom of it toward the vein has penetrated 43 feet, through clay mixed with little streaks of quartz. The pitch of the vein as developed in the level 50 feet above, is fully 45 degrees, therefore it will be cut by this lower drift inside of 20 feet further. Water was encountered in the face of the drift night before last, which, if it should increase much, may give a little trouble, but it is no bad indication by any means. The good body of ore at the north side of the surface workings, and which furnishes the principal supply of the mill at present, has been drifted upon 45 feet to the northward, and and 70 feet southwest without finding its full extent in either direction. Neither is its height ascertained, but there is evidently enough of it in sight to run the mill over a year. The drift from the car-track tunnel to connect with this body by means of a winze, is now in 28 feet. The winze will have to be about 50 feet deep. The drift from the car-track tunnel to connect similarly with the southwest body is completed, and the winze or raise from it commenced. The air shaft which was blocked up by the recent surface cave is cleaned out, therefore the ventilation is excellent throughout the mine. The mill is pounding away on a steady run, and the usual regular monthly dividend of the company, 50 cents per share, or $2 50 per foot, was declared on the 9th inst., payable next Wednesday.

"YELLOW JACKET.—Nothing particularly new or interesting to report. The lower level, from which the principal ore yield is taken, is looking well, and about the same as at our last report. The winze, or raise, from the 800 to the 700-foot level, completed last week, gives a splendid circulation of air throughout the entire mine, and preparations are being made to largely increase the ore product. A new ore dump is nearly completed at the south side of the north hoisting works, close to the railroad track, so that the ore can be dumped directly from the mine into the cars for transportation to the company's mill on Carson River. A vast amount of low grade ore in the 700-foot level of the old mine, heretofore unavailable, will thus be profitably disposed of.

"TWIN.—This famous and valuable little mine, at Silver City, yields about $15,000 per month. The vein is all gold ore, and about fifteen tons per day are extracted, of which eleven tons are worked at the lone mill, yielding from $25 to $30 per ton; the other four tons are worked in arrastras on Carson river, yielding $75 per ton. The hoisting engine is 180 feet in from the mouth of the main adit tunnel, at which point an incline follows the ledge 210 feet in depth, developing a splendid body of rich ore between three and four feet wide—the size of the vein. In the main tunnel, 400 feet beyond the engine, another very good body of ore is developed.

"OCCIDENTAL.—An extensive body of extra rich ore has recently been developed in the old mine, at the extreme North end, which is yielding bullion at a very g atifying rate. The mine generally is looking better than ever, and has ore enough in sight to last for the next six or seven years. The face of the lower tunnel is not yet in the main pay streak, but the indications are excellent and constantly improving.

"OPHIR.—Mine still flooded, there being about 400 feet of water in the new shaft. A new engine will be put in operation next Monday, and it is confidently expected the water will be got out within thirty days.

"OVERMAN.—Present yield about 135 tons per day, principally from the 226-foot level; average assays of car samples, $43. The body of ore at this point averages 36 feet in width.

"HALE & NORCROSS.—Men shut in the mine since last Saturday, and outsiders not supposed to know what is being developed at the new lower level. A strike of good ore is reported.

"SAVAGE.—Nothing new, except that the new and rich body of ore recently developed is not looking quite as well."

THE MONTE CHRISTO MINE.

The Gold Hill *News* says: "Work has been resumed on the old Monte Christo mine, in Flowery, and the ore bids fair to pay well for crushing. In early times the mine had a big name and sold at high prices, but the cost of reduction at that time was so great that the ore would not pay. The rock is now being crushed at the five-stamp water mill at the lower end of Six-mile Canyon, and although a clean-up has not yet been made, it is quite certain that it will pay well. Mr. S. B. Seager, owner and Superintendent of the mill, has had much experience in working the ores of the State, and will come as near getting out all the precious metals the rock contains as any one else. Gold predominates in the ore. The lead is a large one, and is capable of yielding an immense amount of ore."

MINING IN THE HUMBOLDT REGION.

From the Humboldt *Register*, Nov. 6, we glean the following interesting items of news:

"ALASKA MINE.

"Some years ago a gold ledge called the Crœsus was discovered near Dun Glen, which caused intense excitement, and led to organization of Sierra Mining District. The Crœsus was a very rich specimen gold ledge, and the owners in 1863 picked up several hundred dollars on the croppings, and then spent large sums of money in running tunnels and sinking shafts, confidently expecting to make large fortunes, but all to no purpose. Since the failure of this mine our miners have paid but little attention to gold ledges as a general rule. Many, however, have always had an abiding faith in the richness of Crœsus Hill. Messrs. White, Wenthworth & Aikin have shown their faith by their works. They commenced to sink a shaft where they thought a good mine ought to be, not far from the old Crœsus location. They went down but a short distance when they struck a vein twenty inches in width. This vein they are following, and are now at a depth of thirty feet. The vein maintains a uniform width and the ore assays in silver $150 and $750 in gold. The owners are highly elated with their prospects. The Alaska gives promise of a fine paying mine. It is situated ten miles south of the railroad, in the Dun Glen mountains.

"ORIGINAL WINNEMUCCA.

"T. E. Kimball, agent of a San Francisco company, has opened a road to and extracted from the Original Winnemucca mine several tons of ore, which he intends to ship below immediately. This work is done by Mr. Kimball for the purpose of thoroughly testing the quality of the ore by working process. If the yield proves satisfactory active operations on the mine will be commenced immediately. The mine is now owned by Thacker Brothers, and if the result of the ore proves to be as favorable as anticipated, a number of miners will find steady employment.

"ANTELOPE DISTRICT.

"Messrs. Thacker & Winans, who have been prospecting since last August in the Antelope range, west of the Humboldt river, have succeeded in discovering extensive veins of copper and silver in that hitherto unexplored region. They are extracting ore from one of the most promising of the newly discovered mines, which they intend to ship to San Francisco for reduction. There is an extensive mineral belt in the Antelope region, which is well worthy the attention of enterprising prospectors."

LETTER FROM UNIONVILLE.

A correspondent of the Elko *Independent*, writing from Unionville, October 29th, says: "Availing myself of the kind invitation of S. D. R. Stewart, Superintendent of the Silver Mining Company, who generously tendered me the use of a sujugated mustang, I made a visit to the Arizona lode one day this week, and devoted an hour or two to a stroll by candle-light through its glittering caves and subterranean passages. Starting in on the main level where the ore is brought to the surface, the first 250 feet is in the tunnel of John C. Fall, at the south end of which we reach the Silver Mining Company's ground. The course of the ledge from this point is nearly due south, and the Silver Mining Company has followed it a distance of 250 feet, taking out the ledge as they progressed, which will average the whole distance not less than seven feet in thickness, not a pound of which but will pay for working. When brought to the surface, the ore is sorted, and the best of it sent below for shipment to England. Mr. Stewart informed me that he had shipped 30 tons this month, most of which was worth $800 per ton, while his mill is kept constantly at work on lower grades of ore. The Silver Mining Company cleared in the month of September about $12,000 over and above expenses, which paid off all the debts of the company, and this month will clear about $15,000, which will yield a dividend of about $12 per foot to the fortunate owners of the mine, with a reasonable prospect of an equal yield for a number of years, as they have scarcely made an impression upon the apparently inexhaustible lode of rich silver ore. The yield of Fall's mine is about the same as the Silver Mining Company's mine; both companies being on the direct road to princely fortunes in a few years' time. The developments in the Arizona have had a wonderful effect in stimulating others to persevere in the search of silver mines, and have started an army of active prospectors, who are again swarming over the mountains, reminding us of the halcyon days of '63 and '64, when every boulder and limestone reef from base to summit of mountains contained a notice of location.

"The De Soto Company, whose mine is located in Star district, has levied an assessment of $2 a share on the stock of the company, and intend to go to work with renewed vigor in the spring. This is undoubtedly one of the best mines in Humboldt, and only requires a little vigorous work to demonstrate the fact that it is not second to the Arizona in this district.

"Gen. Weaver and George Lovelock have made a famous discovery on the summit of the mountain, directly in a line between the Arizona on the east side of the mountain and the Alpha on the west side. The ore is of a dark brown color, considerably decomposed, resembling very much the surface croppings of the Golconda lode, in Gold Run district. Several tests have been made by working process, yielding from $35 to $60 per ton. The lode is said to be about 20 feet in width, cropping out for a long distance on the surface of the ground.

"BATTLE MOUNTAIN DISTRICT.

"This district, which is now the pride of Humboldt, is developing vast deposits of mineral wealth every month. Late news from there furnishes an account of the wealth, permanency, and high expectations held of a comparatively new discovery, owned principally by Messrs. Fillbrook & Kellogg. The mine is called the Toledo, and has been stripped 40 feet in width, and is increasing as work progresses. The ore assays 30 per cent. in copper, $80 per ton in silver, and $10 per ton in gold. It is distant only seven miles from the railroad. The Little Giant mine, which has produced a large amount of silver during the past year, is distant about three-fourths of a mile from the Toledo. This district has taken a rapid stride forward in the last few months. In Copper canyon there are about 75 men employed in the mines erecting sheds on work, that they may go on unimpeded in cold and stormy weather."

Colorado.

MINING IN NEVADA.

The Central City *Herald*, Nov. 6, has the following account: "As much ore is now being taken from Quartz Hill and the south side of Nevada as at any time during the past summer. The supply of ore seems to be inexhaustible in that locality. New claims on many of the leads are being worked, and many which have been abandoned have since proved to be valuable. Heretofore but few mills in Nevada have been able to run during the winter months—want of water being

the cause. Measures have been taken by several mill men to obviate this difficulty. Ten mills have been worked during the past summer in Nevada. Of these six will be supplied with water, so as to continue in operation through the winter. B. C. Waterman is laying an underground flume (out of reach of frost) from the Flack mine to the Kas Colorada mill. Clayton's mill in like manner will be supplied with water from Stalker & Standley's claim. Potter & Holley's upper mill is supplied by springs near by. Chatfield is cleaning up the cistern in the LaCrosse mill with the intention of working the same all winter. Beverly has commenced a ditch to supply his mill with water at all seasons. We have not learned how soon this will be completed. The Quartz Hill Company's mill has stopped work while a new boiler and machinery is being introduced. Mr. Sullivan has built a dam beneath the bridge near the mill, which will supply it with all the water required during the winter months. Waterman's excellent mill at the head of Eureka Gulch is to have an addition of five stamps next month, making twenty stamps in all, double issue. This mill has but few equals in the country, either in its crushing capacity or gold saving qualities. From a spring near by double the quantity of water required is furnished the mill, with no danger of being frozen out. It is supplied with ore from the Waterman claim on the Gardner lode. Messrs. Aldrich & Quail are engaged in getting out the ore from this mine. Kinney is working the claim east of them on the same lode. The ten mills of Nevada, which have been at work night and day during the past summer, have not been able to crush one-third of the ore taken from the mines in that district, the greater part being carried to Black Hawk. Work is being prosecuted with great activity on the hills on the south side of Nevada. The Gardner, Roderick Dhu, Missouri, Mercer County, Kent County, California and others are being worked successfully. For eighteen months McNear, McGaskell & Slattery have worked the Rising Sun lode, and most of the time with discouraging results. They did not, however, despair, and last week, at a depth of two hundred feet below the surface, struck a body of ore which promises to reward them for past labor and expense. They have a seven-foot crevice (the ore vein is much less) containing rich pay. Shaw & Findley have also developed a rich lead further west which runs fourteen ounces per cord. James Clark and Thomas Gleason have commenced running a drift in the LaCrosse Tunnel, supposed to be about two hundred feet distant from Douglas & Dougherty's claim on the 'Missouri.' The third and last party of men (eleven in number) who are working out their pay due them from the Ophir Company in that mine are taking out three cords of ore per week, which yields from seven to nine ounces per cord. This ore is crushed at Woodbury & Norton's mill, Black Hawk. This party had chosen an old level in the mine supposed to be worthless, from which to obtain their pay. After sinking a winze they came upon this ore, which excels anything lately discovered on the Ophir. Tunis & Hotchkins, who are sinking on the 'California,' west of the 'Jones' claim, have reached a depth of seventy-five feet. They have taken out no pay yet, but the indications are very favorable for success in that direction. Near by several men, whose names we have not learned, have been sinking through the cap all summer, and are now taking out as good ore, apparently, as that from Stalker & Standley's claim. Alexander Cree has leased the Kent County mine for three months, from Randolph, agent for the company owning the same. It contains a crevice of from three to four feet in width. The ore runs from five to eight ounces. Four or five parties have lately commenced work on different claims on the Kent County lode. Only one of these claims is paying. On the north side of Nevada mining also continues active. Mr. Hayden's new engine and hoisting machinery on the Prize lead are busily at work, and he will now make up for time lost in putting up the same. Two days were required to remove the water from the mine, and on Wednesday he again commenced sinking. This mine is now the best paying lead on the Prize Hill, and furnishes a large quantity of ore. Capt. Phillips and Wm. Burns are sinking on the claims of the 'Jones,' formerly leased to Andrews & Sullivan. This ore runs well, but the crevice is narrow. Andrews & Sullivan are putting up a whim on the next claim east on this lead, which is the discovery claim of the 'Jones.' O. F. Albro has commenced work on the Shafer lode with favorable indications. Balsinger & Topping have a fine large crevice on the Slaughter House lead. Their quartz, from a depth of forty-five feet, runs sixteen ounces per cord."

THE FUEL QUESTION.

The Georgetown *Miner* thus discourses on this subject: "Georgetown, from the constantly increasing extent and variety of her mining enterprises, has a deep concern in the question of cheap fuel. Mines properly worked require large amounts of timber in the shafts, drifts, and stopes, and where this timber is to come from, and what is to be its cost, will soon become an important question. To-day, it is true, we do not feel cramped for timber or fuel, but it is very evident that this state of affairs will not continue long.

"Each coming year will witness the opening of new lodes, new tunnel enterprises are being organized, additional steam-power is being introduced, new reduction works are about to be erected, and the capacity of the older ones will yearly be increased, and last, but not least, our population is yearly increasing. Each year makes additional demands on our forests, and sees the increasing area of denuded hillsides. Year by year the source of supply of our timber and fuel is moved backward, and its cost increased.

"Who can estimate the amount of ore that will be yearly mined here in three years from now? The amount mined in past years has been increasing year by year in geometrical ratio. To-day, with the tunnels now being driven, and those about to be begun, it is very evident that our yearly production will be vastly increased. This implies the necessity of increased facilities for reduction, and means the still faster consumption of our present supply of fuel; we should remember that we have not an unlimited supply of wood at our command, the lower part of the county has its own increasing demands to supply, and the distance which fuel can be transported by teams, at a low cost, is not so great that we should dare flatter ourselves that our forests will continue to furnish boundless supplies.

"Let Georgetown take warning by Virginia City. Our forests are of slow growth, and to-day we are burning wood that should be reserved for mine timbers; our anxiety should not be, how long can this continue, but as to what is the remedy?

"There are none of us here but who are directly or indirectly interested in the successful prosecution of mining enterprises, and all are therefore equally interested in the vital question of cheap fuel.

"The amount of ore mined, suited for reduction by smelting, is yearly increasing, and it is an open question whether much of the ore now treated by amalgamation could not be more cheaply smelted where fuel as cheap as it would be had we a railroad communication with the valley.

"The question of the hour for Georgetown, and for Clear Creek county, is no trivial one. It is by what means can we reduce our low grade ores at a profit—by low grade ores we mean those yielding from $30 to $60 per ton; concentration, it is true, is doing much, and will do more to remove difficulties regarding the profitable working of this class of ore, yet does not entirely accomplish this object. Our great want is railroad communication with the coal-beds of our Territory, and the erection of reduction and smelting works on the spot where fuel, fluxes, and labor are the cheapest. It is so very necessary for the economical transportation of our ores, and their subsequent treatment, that questions of who may build it, or where its terminus shall be, are of but small interest to us, so that we have a perfect connection with the East, and that speedily.

"Why do we ship our first-class ores to England, and to Newark, N. J., for reduction? Simply because cheaper fuel and labor can more than pay the cost of transportation, and allow the profitable extraction of the base metals. Skillful workmen can operate as well here as there; and, when railroad communication is obtained with the coal beds of Golden City and vicinity, we shall see the erection of smelting and reduction works in the valley, as skillfully managed, and with as good results obtained as in Swansea and Newark.

"The greatness and wealth of Colorado depends, in a great measure, on the success of her mines, and Georgetown and vicinity are destined to play no mean part in the production of the precious metals. But railroad communication, with cheap fuel and labor, are necessary to place her mining industry on a firm basis.

"As much as we are interested in the growth of Georgetown, and it is our hope and expectation to see here a city of 10,000 inhabitants before five years; as much as we desire to see improvements going on around us, we are yet compelled to the belief that it is cheaper to transport one ton of ore *down grade* to the place of reduction than to haul five tons of fuel, fluxes, etc., up grade to the mine. The question of the suitability of Colorado coal for smelting purposes is settled; it can be coked; of its cheapness there can be no doubt. The mines being worked, supply coal for the miscellaneous purposes of the valley, at a cost (at the mine) of not exceeding $4 a ton. Stimulate the production by increased demand, and with better opened mines, and more of them, we will see the price still further reduced; the coal miners of the valley can better afford to sell 100,000 tons of coal at $3 a ton than 20,000 tons at $4. We desire to treat our ores at as low a cost as is possible, and with our present facilities for transportation we fear we shall, in a short time, find ourselves in the same condition that Virginia City, Nevada, was before the completion of the Virginia City and Truckee Railroad, with wood at $15 a cord, and the cost of fuel (and with amalgamation works only) one-third of the entire expense of treatment of the ore. Let us take warning by their experience on the fuel question. We have a line perfectly practicable for a railroad; we have unlimited supplies of coal at the base of the mountains, and at the same place; all necessary fluxes, fire-clay, etc.; these, with the cheaper labor of the valley, are the real solution of the growing necessity of the manner in which our low grade ores can be profitably treated."

THE MINES.

We take from the same paper, Nov. 11, the following items of mining news: "The season's operations thus far have fully demonstrated the fact that development alone is required to render our mines the most productive of any in the known world. A glance at what has been done in the Terrible, Brown, Equator, and other mines, is alone sufficient to show that capital expended judiciously and economically in legitimate mining will pay large profits. On Tuesday last, at the Terrible mine, they raised from the east slope thirty tons of first-class ore, worth $15,000 in coin. No mine in the Territory, we believe, has ever raised the same value in ore in any single day. No better proof of the legitimate value of our mines is wanting than such results as the above. The Baker Company shipped, on Saturday last, 1,151 ounces of silver bullion; coin value, $459. In two weeks' time we will witness a great improvement in the production of silver by this company. They have experienced great difficulty in crushing with their ball pulverizer, and have ordered two new ones of a different and improved pattern, which will increase their crushing facilities so as to keep their chlorodizing cylinders fully supplied. A company has been organized on the Linn tunnel, with capital sufficient to make it a paying institution, and work will be immediately resumed. It is a Colorado company, comprising several of the wealthiest and very best citizens in the Territory, with Gen. B. M. Hughes as President. Thus is another enterprise placed upon a firm capital basis. Mining is being prosecuted with greater activity at the present time than ever before. From present appearances our bullion product for the present year will reach $250,000."

California.

THE LEADING MINES IN NEVADA COUNTY.

The Nevada *Gazette*, comparing the products and profits of the Amador and Eureka mines, says: "The Amador and Eureka are the leading gold mines of the State, and their product and net earnings during the past year have been nearly equal. The *Alta* gives the gross yield of the Amador for the ten months ending in October, which foots up $537,054, and the dividends during the same period amounted to $313,400. The net receipts of the Eureka mine, for the year ending September 30th, were $346,160 56, but the dividends amounted to only $264,000; $49,894 having been paid for an adjoining mine, and $32,266 having been retained in the treasury above the amount there at the beginning of the year. The two mines have run nearly an even race for the year; but in the present production the Eureka is ahead. While the Eureka is thus running even with, or perhaps a little ahead of the Amador, there are a number of mines in the Grass Valley district that lead all other gold mines in the State, unless it may be the Sierra Buttes.

"PERRIN'S MINE.

"The Grass Valley *Union* says the yield of Perrin's mine for October was $11,200; the total expenses $2,058, giving a net yield of $9,143. The ledge improves the deeper it is worked, and the coming month will show a gain in yield over the last one without increase of expense. The rock can be taken out much more rapidly than it can be crushed, and the miners are now some six hundred loads ahead of the mill.

"SELLING OUT.

"A portion of the personal property belonging to the 'monstrous failure,' the French sulphuret works at Canada Hill, has been sold by the Sheriff, together with the monster cylinder, which cost $1,200 for transportation from San Francisco. These works cost over $80,000.

"UNION HILL.

"The Union Hill Mining Company clean up about $12,000 every month."

MONITOR DISTRICT, ALPINE COUNTY.

The Alpine *Miner*, Nov. 6, has these items:

"Another cave of magnitude occurred in the Globe tunnel some days since, and the Superintendent changed his base, made a flank movement, and is now cutting a drift to the left, in hopes to penetrate the lode at right angles, and be better able to keep up the ground. Water 'till you can't rest' is coming in, and it is thought the long sought is close at hand.

"Ore from the M. C. M. Tunnel No. 3 is soon to be crushed and sent out to Dall's mill for treatment, for the purpose of obtaining the opinion of the owner and other experienced metallurgists of that mill as to the best mode of reduction for this ore."

THE DUNDERBERG TUNNEL IN MONO COUNTY.

A correspondent of the Stockton *Independent*, writing of this enterprise, says: "The tunnel of this mine, owned by the Wurtemberg Company, extends six hundred feet into the mountain, and at its terminus is two hundred feet in perpendicular height from the surface. This company has been steadily at work for two years, and now think they have reached the casing of the ledge, which is twenty feet wide, and has been traced for more than a mile. Before commencing their tunnel, the company sunk a shaft on the lode to the depth of 40 feet, and the rock yielded at the rate of $52 per ton: * * Since writing the above, I am informed that the tunnel has reached the lode, and the indications are good."

Idaho.

THE POORMAN MINE.

The Owyhee *Tidal Wave*, Oct. 28, has the following account of this mine: "The Poorman mine, at a depth of fifty feet below the 400 foot level, where a drift is run six feet each way from the shaft, shows better evidence of permanence than it ever has above. Hitherto a want of casings of a continuous character has been a discouraging feature, but now we are informed that after wandering in maizes dark for several months through a section of the mine in which but little ore could be found, and the country rock broken and disorganized, they find a good sound ledge with perfect casings, and that the ledge has changed its dip from west to east, indicating that by some convulsion of nature a break has occurred at that point, giving the surface portion an unnatural inclination, and mixing it up generally with country or granite and other worthless matter. During the search for the vein it has frequently been announced that the Poorman was sick, or that it had taken the character of an indigent sick man, but it is now pronounced convalescent, and from a careful diagnosis of the case it is believed will soon present a more robust appearance than ever."

THE POTOSI MINE.

The same paper, October 7, has the following account of this mine: "The Potosi mine, which we have had frequent occasion to mention during the summer, is being opened higher up the hill. We visited it on Friday last, by invitation of C. S. Peck, Superintendent, and were shown some very fine ore taken from the present works. Free gold is visible in a large proportion of the rock on the dump, and it is expected that a few feet more will reveal something still richer, as they will then be under a portion of the ledge that is immensely rich on the surface. We saw rock taken last fall from the cut above the tunnel so full of wire gold as to cling together after being broken, and it is reasonable to expect something good when that point is reached. The vein at the point now being worked is about a foot in width, of hard rock, encased in talc, with an occasional gouge of decomposed quartz. A curious jog in the vein occurs at the mouth of the tunnel; the ledge jumps two or three feet square to the right, and resumes its course."

LOON CREEK.

A correspondent at Loon Creek writes that a new excitement has broken out seventy miles northeast of that place, where Nate Smith is said to have struck a basin as extensive as Boise. Some four hundred men left Loon Creek in one day for the new diggings, leaving that camp nearly deserted.

Michigan.

THE COPPER MINES.

The Houghton *Mining Gazette*, November 11th, says: "We learn that the Messrs. Hulbert have sold their Red Jacket location to the Hecla Mining Company for $112,500. The following products have been reported for October: Pewabic mine—masses, barrel, and stamp work, 55 tons 753 lbs.; Franklin mine—masses, barrel, and stamp work, 63 tons 1,243 lbs."

THE CASCADE IRON FURNACE.

Relative to this new furnace, the Marquette *Mining Journal*, November 6th, says: "Messrs. Bagaley, Smith, and others are now here for the purpose of selecting the site for the proposed new furnace, on the cascade property. A force of men will be put to work immediately, opening the mine, it being the intention of the company to have both mine and furnace working early next spring. The new furnace will indeed be something new in this region. It will have an iron stack, a sixteen feet bosh, and a capacity for making thirty tons a day. All the work that can be done on the ground will be completed this winter, and the stack and machinery will be ready to ship by the first boats in the spring."

Mexico.

MINING CASUALTY IN GUANAJUATO.

The Brownsville *Ranchero*, November 7th, had the following account: "A fearful accident occurred at the mine of Jesus Maria, in the State of Guanajuato, on the 9th ult. While some of the men were engaged at work in the said mine, an immense mass of rock, over a hundred thousand pounds weight, fell upon them. The news of this terrible accident soon spread all over the town of Mineral de la Luz. People began to flock to the spot of the disaster by hundreds, and at 11 o'clock A. M., over 3,000 persons crowded the mouth of the mine, begging permission to enter the mine to see if any of their relatives had perished. Being refused, they crowded the streets, rending the air with their doleful cries, and the place bore a death-like aspect difficult to describe. A short time afterward the unfortunate miners were taken out, when it was ascertained that only fourteen of their number had perished."

Oregon.

THE SANTIAM MINES A FAILURE.

The following from the *Statesman* records the "positively last's appearance of Santiam upon the public boards: "J. R. Moore and G. A. Eades returned on Tuesday from the desolate regions on the headwaters of the Santiam, once the scene of so many hopes. A host of expectations were created by Santiam discoveries; tens of thousands of dollars were expended in constructing a road, opening mines, building dwellings, and in erecting a sawmill and quartz mill. The work was well done, and proved expensive, because great results were hoped for, and no pains were spared to provide the needed means and appliances. Santiam stock is now no better than waste paper, the buildings are literally the habitations only of bats and owls, and the dreary tunnels are hideous bores."

New Hampshire.

NEW SOAPSTONE QUARRY.

The Peterboro' *Transcript*, Nov. 13, says: "Extensive preparations are being made to commence work on a new soapstone quarry in the southwestern part of Weare. It is owned by Mr. John Bartlett. The stone is pronounced, by people qualified to judge, to be of superior quality, and it is thought that there is an almost unlimited quantity."

MARKET REVIEW.

The Coal Trade.

NEW YORK, Nov. 26, 1869.

WHOLESALE.—The market is considerably unsettled by the low prices which Coal sold for at the Scranton sale of Wednesday last. Immediately after the sale it was thought that the great falling off in prices might cause a little panic. But not so. The market is very regular, and orders taken for coal, prior to the sale, are being filled. Some of the dealers, who never have any mind of their own, have seen fit, on some trivial excuse, to throw up contracts made prior to the sale, at figures that look to them now as exhorbitant; but those parties who look a little into the future are wise enough to take all the coal they can get. In our opinion, those who require further supplies of coal cannot do better than to buy at present prices. It is probable that there will be a general turn out in the Schuylkill region, and things look to us pretty much as they did last year this time, when the low prices "sent out" the Schuylkill men, which gave us the high prices which ruled for the rest of the season. There is another thing which should be considered. We are this year 400,000 tons less in supply compared with the season of 1868. Considering these points, we fail to find any just causes for the belief that prices will recede. These Scranton sales are humbugs, and will continue to be until the company can deliver an order for coal in a reasonable length of time, and not compel vessels to wait three or four weeks, as they do now. We have the past two weeks heard of cases where vessels have laid twenty days at Elizabethport waiting for a cargo, and other instances where the freight has amounted to $1 50 per ton, being some 90 cents more than is paid by other parties shipping from the same place—delays, demurrage, etc., causing the difference. We claim that, until these disabilities are removed, the prices obtained at the auction sales cannot be taken as any criterion of the market. Facts speak for themselves. We heard offered to-day, for a cargo of Scranton Coal which happened to be in the market, $8.75; and fifty cargoes could be sold to-day at the same figures. Where is the influence of the Scranton sale? It's all bosh. They cause trouble and discontent among the mining fraternity, disparagements among consumers; and they are generally a farce, and respectable dealers will hardly give countenance or attendance to them any longer. Below will be found a full report of the sale, compared with that of October, also with that of November, 1868:

AUCTION SALE OF SCRANTON COAL.—DECLINE IN PRICES.

The Delaware, Lackawanna and Western Railroad Company to-day sold seventy thousand tons of Scranton coal, John M. Draper acting as auctioneer. The attendance was not as large as usual, and the bidding was far from spirited. The decline on stove coal was about $1 a ton, and on other sizes the average fall was $1 48.

Lump coal started at $5 50, at which rate 600 tons were sold, but the price fell rapidly until it reached $4 05. Steamboat coal started at $4 25, but this sum could not be maintained, and most of the amount offered brought $4 02½. Stove coal started at $7 35, and sold down to $7 15. The following is a report of the various prices obtained:

LUMP.

600 Tons, at	$4 50		3,300 Tons, at	$4 27½	
100 do	4 25		1,000 do	4 22½	
300 do	4 20		800 do	4 12½	
2,700 do	4 07½		1,200 do	4 05	

STEAMBOAT.

500 Tons, at	$4 25		100 Tons, at	$4 10	
200 do	4 07½		2,000 do	4 05	
12,000 do	4 02½				

GRATE.

4,900 Tons, at	$4 35		10,000 Tons, at	$4 30	

EGG.

900 Tons, at	$5 32½		2,500 Tons, at	$5 30	
600 do	5 27½		1,350 do	5 25	
2,650 do	5 15				

STOVE.

950 Tons, at	$7 35		2,160 Tons, at	$7 20	
950 do	7 30		3,650 do	7 17½	
1,200 do	7 25		3,100 do	7 15	

CHESTNUT.

5,650 Tons, at	$4 22½		1,659 Tons, at	$4 15	
2,700 do	4 20				

Nov. 24, 1869.

10,000 Tons Lump	$4 05	@	4 50
15,000 do Steamboat	4 02½	@	4 25
15,000 do Grate	4 30	@	4 35
8,000 do Egg	5 15	@	5 32½
12,000 do Stove	7 35	@	7 15
10,000 do Chestnut	4 15	@	4 22½

Oct. 27, 1869.

10,000 Tons Lump	$5 25	@	5 50
15,000 do Steamboat	5 25	@	5 47½
15,000 do Grate	6 25	@	6 55
8,000 do Egg	6 65	@	7 00
12,000 do Stove	8 07½	@	8 35
10,000 do Chestnut	5 85	@	6 02½

Nov. 1868.

10,000 Tons Lump	$5 25	@	5 60
15,000 do Steamboat	5 90	@	6 30
15,000 do Grate	5 92½	@	6 12½
8,000 do Egg	6 00	@	6 35
12,000 do Stove	7 82½	@	8 50
10,000 do Chestnut	5 65	@	5 96½

The following is the average price obtained for the different sizes:

Lump	$4 19	Egg	$5 24
Steamer	4 04	Stove	7 20
Grate	4 32	Chestnut	4 20
General average on all sizes			$4 26
Average decline do			1 48

RETAIL.—The retail trade remains good.

FREIGHTS.—Masters are taking $1 85 to Boston, which is a little off last week. Freights may be quoted five to ten cents lower.

The following table exhibits the quantity of Coal passing over the following routes of transportation to tide-water, for the week ending November 22, 1869, compared with the same time last year:

COMPANIES.	1868. WEEK.	1868. TOTAL.	1869. WEEK.	1869. TOTAL.
Phila. & Reading R.R.	91,541	2,936 616	107,631	3,458,250
Schuylkill Canal	34,946	913,316	23,542	620,130
Lehigh Valley R. R.	54,023	2,109,314	59,356	1,937,761
Lehigh and Sus. R. R.	16,594	432,071	29,280	821,715
Lehigh Canal	33,953	937,165	8,042	592,074
Scranton North	14 2 8	568 837	14,818	387,620
" South	21,869	964,790	30,439	917,497
Penn. Coal Co., rail	18,704	832 260	14,911	847,729
" " " canal	710	28,250	597	17,873
Del. and Hudson, rail			6,500	138,120
" " canal, north	45,360	1,531,865	50,507	1,109,124
" " " south			4,188	112,101
Shamokin	10 049	452,725	14,437	417,789
Trevorton	1,782	30,520		30,353
Short Mountain	3,762	11 467	2,625	98,103
Lykens Valley Coal Co.	1,964	79,890	3,069	71,767
Huntingdon & Br'd Top	7,494	242,665	6,204	319,280
Wyoming South	14,611	312,764	11,224	310,026
" North	2,139	83,869	3,276	73,741
Williamstown, Coly.	6,374	17,173	6 000	187,953
Total	381,842	12,835,637	396,600	12,508,276
1868		12,508,276	381,842	
Decrease year		327,361	in 14.7 8 week	

Schuylkill Coal Trade.

Report of coal transported over the Schuylkill Canal for the week ending Thursday, November 18, 1869.

	Tons. Cwt.
From Port Carbon	8,579 00
" Pottsville	51 00
" Schuylkill Haven	14,393 13
" Port Clinton	717 00
Total for week	23,540 13
Previously this year	596 589 05
Total	620,129 18
To same time last year	913 316 02

Report of coal transported over the Philadelphia and Reading Railroad during the week ending Thursday, Nov. 18, 1869.

	Tons. Cwt.
From St. Clair	34,524 04
" Port Carbon	8,614 16
" Pottsville	6,572 03
" Schuylkill Haven	34,140 12
" Auburn	3,931 00
" Port Clinton	15,455 02
" E. P. R. R.	112 18
" Harrisburg and Dauphin	14,763 07
Total paying freight	118.914 02
Coal for Company's use	3,172 05
Total for week	122,086 07
Previously this year	3,900,744 01
Total	4,022,830 08
To same time last year	3,493,257 09

Report of Coal Transported over Lehigh Valley Railroad

For the week ending November 20, 1869, and previously this season, compared with same time last year:

WHERE SHIPPED FROM.	WEEK. Tons. Cwt.	PREVI'S Y. Tons. Cwt.	TOTAL. Tons. Cwt.
Total Mahanoy	10,382 12	402 334 18	412,717 10
" Beaver Meadow	13,413 00	378,51 01	391,930 10
" Mauch Chunk		827 03	827 03
" Upper Lehigh		8,581 11	8,581 11
" Hazleton	26,224 07	724,431 10	750,655 17
" Wyoming	11,901 13	424,195 11	436,097 04
Total	61,921 12	1,938,887 11	2,001,109 03
To Lehigh & S. R. R., at P'n. Hav. for rail		4,562 07	4,562 07
Do. for canal	489 12	120,734 09	121,623 12
At Mauch Ch'k for canal	886 00	97,546 03	98,035 15
Total Anthracite	63,597 07	2,161,730 13	2,225,328 00
Bituminous Coal rec'd from Cata. R.R.			
N. C. R R.			
E. P. R R.	1,869 00	14,691 00	16,560 00
P. & N.Y. C. & R.R. Co			
Fall Creek			
Schroeder			
Towanda			
Total by rail and canal	65,466 07	2,176,421 13	2,241,888 00
Same time last year	70,716 20	2,463,017 08	2,533,733 10
Increase			
Decrease	5,249 15	286 595 15	291,845 10
Forwarded East from M'h Chunk by rail	59,355 15	1,878,405 01	1,937,761 03
Same time last year	54,023 00	2,115,290 17	2,169,314 03
Increase			
Decrease	5,332 13	236,885 13	231,553 00

RECAPITULATION.

Forwarded East from M'h Chunk by rail	59,355 15	1,878,405 01	1,937,761 03
Delivered at M'h Chunk	59 02	865 10	924 12
Delivered on line of road above Mauch Chunk	291 11	7,974 01	8,265 14
Delivered above M. Chunk for use of L. V. R.R.	1,458 04	41,128 30	42,586 07
To N. C. R. R., at Mount Carmel		2,516 09	2,516 09
Forwarded North from L & B. Junction	933 08	3,820 10	4,753 18
To L. & S. R. R., at P'n Hav., for railroad		4,562 07	4,562 07
Do. for canal	489 12	120,734 08	121,623 12
Do. Packerton for rail	158 08	4,177 15	4,335 03
At M Chunk for canal	886 03	97,546 03	98,035 15
Total Anthracite	63,597 07	2,161,730 13	2,225,328 00
Bituminous Coal	1,869 00	14,691 00	16,560 00
Total all kinds	65,466 07	2,176,421 13	2,241,888 00

Cumberland Coal Trade.

BY C. & O. CANAL.

For the week ending Nov. 20, 1869, the shipments by the Chesapeake & Ohio Canal were as follows:

	Tons.
American Co.	2,414 19
Borden Co.	1,150 16
Central Co.	998 05
Consolidation Co.	3,097 10
C. C. & I. Co.	1,094 05
George's Creek Co.	780 13
Hamp & Baltimore Co.	769 08
For private parties	3,217 06
Maryland.	929 15
Total for week	15,052 18

B. & O. RAILROAD.

The shipments over the Baltimore & Ohio Railroad for the week ending Nov. 20, 1869, were as follows:

From George's Creek via Piedmont.	Tons.
George's C. C. & I. Company	1,917 03
Maryland "	48 00
Franklin "	1,055 05
Central "	2,104 09
Atlantic "	1,179 15
Piedmont "	1,508 06
Swanton "	775 08
Potomac "	1,651 14
Barton "	2,055 12
American "	874 06
Hampshire "	513 17
Total	13,724 15

Statement of coal transported over the Cumberland & Pennsylvania Railroad during the week ending Saturday, Nov. 20, and during the year 1869, compared with the corresponding period of 1868:

WEEK.

YEAR.	C. & O. CANAL. Tons. Cwt.	B. & O. R. R. Tons. Cwt.	TOTAL. Tons. Cwt.
1869	12,026 03	15,735 19	30,761 02
1868	13,371 05	16,543 02	29,914 07
Increase		2,192 17	846 15
Decrease	1,346 02		

YEAR.

YEAR.	C. & O. CANAL. Tons. Cwt.	B. & O. R. R. Tons. Cwt.	TOTAL. Tons. Cwt.
1869	563,379 14	887,234 19	1,450,664 13
1868	405,664 10	559,319 14	964,984 04
Increase	157,715 04	327,965 05	485,680 00

Lehigh and Susquehanna Railroad.

Report of Coal Shipped South for the week ending Nov. 20, 1869.

WHERE FROM	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.
Total Mauch Chunk Region	11,966 17	202,902 02
" Hazleton "	604 13	123,288 16
" Upper Lehigh "		77,193 12
" Wyoming "	20,451 19	720,748 13
Grand Total	33,023 09	1,121,133 01
Corresponding week last year	33,976 02	886,754 00
Increase	952 13	234,379 01
Decrease		
Forwarded South from Mauch Chunk	27,774 12	767,165 07
Delivered on line of Lehigh & Sus'na R. R., above Mauch Chunk	1,096 00	31,303 18
Delivered to Lackawanna & Bloom. R. R., at Plymouth Bridge	411 06	18,094 13
Delivered to Lehigh Valley R. R. Co., at Sugar Notch		5,151 03
Delivered at Coal Port, for shipment by Canal	3,742 11	299,418 00
Total	33,023 09	1,121,133 01

Lehigh Canal Coal Trade.

Shipped for the week Ending November 20, 1869.

WHERE FROM.	WEEK. Tons. Cwt.	TOTAL. Tons. Cwt.
Total Mauch Chunk Region	2,975 02	189,113 02
" Beaver Meadow "	977 39	94,905 17
" Mahanoy "		2,831 01
" Hazleton "	489 12	118,035 00
" Upper Lehigh "		5,142 07
" Wyoming "	3,601 13	162,347 04
Grand Total	8,044 06	592,074 11
Corresponding week last year	33,953 06	937,164 15
Increase		
Decrease	25,909 00	345,090 04

Prices of Coal by the Cargo,

[CORRECTED WEEKLY.]

	AT NEW YORK, Nov. 26. R. A.	W. A.	AT PHILADELPHIA, Nov. 25. R. A.	W. A.
SCHUYLKILL.				
Lump	$— —	$6 00	— —	6 00 to — —
Steamer	— —	6 00	— —	6 00 to — —
Broken	— —	7 00	— —	6 00 to — —
Egg	— —	7 5	— —	7 00 to — —
Stove	8 50	8 50	— —	7 00 to — —
Chestnut	— —	6 00	— —	5 50 to 6 00
Pea	— —	— —	— —	— —
LEHIGH.				
Lump	— —	8 50	— —	— —
Steamer	— —	8 50	— —	— —
Broken	— —	8 00	— —	— —
Egg	— —	8 00	— —	— —
Stove	— —	8 50	— —	— —
Chestnut	— —	7 00	— —	— —
Pea	— —	— —	— —	— —
SPECIAL COALS.*				
Diamond Vein	R. A. 9 50		— —	— —
New England	" — —		— —	— —
Locust Dale	W. A. 9 00		— —	— —
Honey Brook, Le'h	W. A. 8 00 to 8 50		— —	— —
Spring Mount	" " 8 00 to 8 50		— —	— —
Sugar Creek	" " 8 00 to 8 50		— —	— —
Sugar Loaf	" " 8 00 to 9 50		— —	— —
Fulton	" " 8 00 to 8 50		— —	— —
Stout	" " 8 00 to 8 50		— —	— —
Old Comp'y's	" " 8 00 to 8 50		— —	— —
Cross Creek	" " 8 00 to 8 50		— —	— —
Chauncey	" "	— —	— —	— —
Girardville	" "	— —	— —	7 00 to 7 50
McMichael	" "	— —	— —	7 00 to 7 50
Duncan	" "	— —	— —	— — to 8 00
Shamokin	" "	7 50	7 50	— —
Lykens Valley	" "	— —	8 00	— —
Broad Top	" "	— —	5 00	— —
Hill & Harris	" "	— —	— —	— —
Henry Clay	" "	— —	7 50	— —
Powelton	" R.A.	— —	7 50	— —
Burnside	" "	— —	— —	8 00
BITUMINOUS COALS.				
Kittaning Coal Co.'s Phœnix Vein f.o.b. at Phila.				$5 25
Lemon " "				5 00
Cumberland C. & I. Co.'s on board			N. Y.	7 25
Central C. & M. Co.'s	"		"	7 62
Consolidated Coal Co.'s	"		"	7 25

*Dealers in these coals may be found in our advertising columns.]

Company Coals.

	L.	Str.	Gra.	Eg.	Sto.	Cst.
Scranton at E. Port	6 50	6 50	6 75	7 25	8 50	6 50
Pittston at Newb'g	6 40	6 40	7 00	7 50	8 25	6 60
Lackawanna at Rond't.	6 50	6 75	7 00	7 25	8 25	6 75
Wilk'b're at Hoboken	6 50	6 50	7 50	7 25	8 00	6 50

For freights to different points, see "Freights."

Prices for Coal at Mauch Chunk.

	F.L.	Bro.	Gra.	Eg.	Sto.	Cst.
Lehigh	$4 25	$4 75	$4 75	$4 75	$5 00	$4 25
Wilkesbarre	4 25	4 75	4 75	4 75	5 00	4 25

For freight to Elizabethport and to New York see "Freights."

Prices of Foreign Coals.

November, 1869.

Duty $1 25 per ton.

Corrected weekly by PARMELE BROS., No 32 Pine street, New York.

Liverpool Gas Caking	$ 9 50@— —
" " Cannel	14 00@— —
" House "	17 50@18 00
" " Orrel	16 00@18 00

Per ton 2,240 lbs., ex-ship.

PRICES FROM YARD.

Liverpool House Orrel, screened	$16 00@18 00
" " Cannel, "	18 00@19 00

Per ton 2,000 lbs., delivered.

Prices of Gas Coals.

November, 1869.

PROVINCIAL.

Duty, $1 25.	Coarse. Gold.	Slack. Gold.
Block House	$1 75	@— 75
Gowrie	1 75	@— 75
Lingan	1 75	@— 75
Sydney	2 13¼	@— 71½
Pictou	2 13¼	@1 10¾
Little Glace Bay	1 50	@1 00
Caledonia	1 50	@— 75

AMERICAN.

	Coarse. Currency.	Slack. Currency.
Westmoreland Co	— —	@— —
Despard Coal Co	$8 50	@8 00
Penn	— —	@— —
Newburg Orrel Gas	— —	@— —
West Fairmount Gas Coal	— —	@8 00

AT PHILADELPHIA.

Powelton	$7 80

Prices at Baltimore—Nov. 1869.

Wholesale Prices to Trade.

Wilkesbarre, by cargo or car load	$7 50@8 00
Pittston and Plymouth	7 25@8 75
Shamokin Red or White Ash	6 50@7 00
Lykens Valley Red Ash	7 00@7 80
Trevorton, Red Ash	— —@— —
By retail, per ton of 2240 lbs. delivered	9 00@9 75
Georges Creek & Cumberland f. o. b. at Locust Point for shipping	4 85@5 00
West Fairmount Gas f. o. b.	— —@6 50

Prices at Georget'n, D.C., & Alexandria, Va.

November, 1869.

George's Creek and Cumberland f. o. b. for shipping $4 75

Prices at Havre de Grace, Md.

November, 1869.

Wilkesbarre and other White Ash for cargoes	$— —@7 25
Lykens Valley	— —@7 50
Shamokin Red or White Ash	— —@7 25
Trevorton and Zebra Valley	— —@7 00

Rates of Transportation to Tide Water.

BY RAILROAD.

TO PORT RICHMOND, PHILADELPHIA.

Philadelphia and Reading Railroad, from Schuylkill Haven	$2 50

From Port Carbon, 8 cents per ton more.

TO ELIZABETHPORT.

L. V. Railroad from Mauch Chunk to Easton	$1 15
C. R. R., N. J., Easton to Elizabethport	1 70
Shipping expenses at Elizabethport	25
Total	$3 10

TO PORT JOHNSON.

L. V. R. R	$1 15
C. R. R., of N. J.	1 80
Shipping expenses	25
Total	$3 20

TO HOBOKEN.

L. V. R. R.	$1 15
Morris & Essex R. R.	1 80
Shipping expenses	25
Total	$3 20

TO SOUTH AMBOY.

L. V. R. R.	$1 15
R. & D. R. R.	1 10
Cam. & Am. R. R.	50
Shipping Expenses,	25
Total	$3 00

BY CANAL.

Via Schuylkill Canal.

TO PHILADELPHIA.

From Schuylkill Haven	$1 70
" Port Carbon	1 70
" Port Clinton	1 70

TO NEW YORK.

From Schuylkill Haven	$2 20

Via Lehigh Canal.

TO PHILADELPHIA.

Lehigh Canal	$1 14
Freight and towage	1 15
Total	$2 29

TO NEW YORK.

Lehigh Canal	$ 71
Morris "	85
Freight	1 70
Towing	10
Total	$3 36

TO JERSEY CITY.

Lehigh Canal	$ 71
Morris "	90
Freight	1 60
	3 21
For re-shipment	30
Total	$3 56

Via Delaware and Raritan Canal.

TO NEW YORK.

Lehigh Canal	$ 71
Delaware Division Canal	43
Delaware and Raritan Canal	57
Freight	1 45
Towage	20
Total	$3 36

TO NEW BRUNSWICK.

Lehigh Canal,	$ 71
Delaware Division Canal,	43
Delaware and Raritan Canal,	57
Freight,	1 20
Total,	$2 91

For Re-shipment—30 extra for shipping, and 10 cents. drawback.

Freights.—NOVEMBER, 1869.

TO EASTERN PORTS.	From Philadel'a.	From E. Port and Port Johnson.	From Newburg.	From Rondout.
Stamford	$2 00	$1 15	$1 30	$1 25
Norwalk	2 00	1 15	1 30	— —
Bridgeport	2 00	1 15	1 30	1 25
New Haven	2 00	1 15	1 25	1 25
Hartford	1 75	1 75	— —	1 90
New London	2 00	1 40	1 60	1 60
Norwich	2 00	1 40	1 60	1 60
Mystic	2 00	— —	1 45	— —
Stonington	2 00	1 50	1 60	1 60
Sag Harbor	2 00	1 25	1 45	— —
Bristol	2 25	1 40	1 55	1 55
Newport	2 25	1 43	1 55	1 45
Fall River	2 25	1 45	1 55	1 50
Providence	2 25	1 40	1 60	1 60
Dighton	— —	— —	1 60	— —
Warren	— —	— —	1 60	— —
Pawtucket	2 25	— —	1 75	1 65
New Bedford	2 25	1 50	— —	1 75
East Cambridge	3 10	— —	1 85	2 10
Salem	3 10	2 00	2 20	2 20
Newburyport	3 10	2 00	1 85	2 20
Portsmouth	3 10	2 00	2 10	2 10
Rockport	— —	— —	1 90	— —
Saco	3 25	2 00	— —	2 00
Portland	3 25	2 00	2 20	— —
Bangor	3 25	— —	1 75	1 90
Bath	3 25	2 00	2 00	2 00
Middletown	— —	1 50	— —	— —
Amesbury	3 25	— —	— —	— —
Boston	3 10	2 00	2 25	2 25
Cambridgeport	3 10	— —	1 85	2 05
Taunton	3 10	2 00	1 75	— —
Derby	2 00	1 25	1 90	— —
New York	1 55	80	85	85
Hackensack	1 75	— —	— —	— —
Jersey City	1 65	80	85	85
TO RIVER PORTS.				
Troy	1 75	1 25	60	65
Albany	1 75	1 24	55	50
Coeyman's	1 60	— —	55	50
Stuyvesant	1 50	— —	50	45
Cocksackie	— —	60	45	45
Hudson	— —	50	40	50
Catskill	— —	— —	40	35
Poughkeepsie	1 60	75	30	25
Fishkill	1 60	— —	30	30
Cold Spring	1 60	70	30	30
Haverstraw	— —	50	45	55
Nyack	1 60	55	50	50
Sing Sing	1 60	— —	60	50
Yonkers	— —	40	60	55
New York	1 55	80	70	—
Saugerties	1 55	— —	35	30
Rhinebeck	1 60	— —	30	35
Rondout	1 60	60	30	25
Tarrytown	1 60	80	60	—
West Point	1 60	75	30	50

Foreign and Provincial Freights.

November, 1869.

Foreign.	
Newcastle and Ports on Tyne	£15@£17 keel
Liverpool	15s. —. do
TO NEW YORK.	
Provincial	
Sidney	$3 25
Lingan	3 25
Cow Bay	3 25
Port Caledonia	3 25
Little Glace Bay	3 25
TO BOSTON.	
Sydney	$2 75
Lingan	3 75
Cow Bay	3 25
Port Caledonia	3 00
Little Glace Bay	2 25

Towing Rates.

TO EASTERN PORTS.

	Per Ton.
To New Haven	$ 40
Bridgeport	40
Southport	40
Westport	40
Norwalk	40
Stamford	40
	Per Boat.
Greenwich	$70 00
Port Chester	80 00
Mamaroneck	70 00
Glen Cove	55 00
New Rochelle	55 00
East Chester	60 00
West Chester	30 00
White Stone	30 00
College Point	25 00
West Farms	25 00
Flushing	30 00
Harlem and Mott Haven	20 00
Port Morris	20 00
Ninety-first street and Astoria	16 00

Boats beyond Port Chester, with less than 200 tons, $20 per Boat.

TO RIVER PORTS.

Boats of 150—250 Tons.	Per Ton.
To Manhattanville	9 cents.
Spuyten Duyvil	9 "
Yonkers	10 "
Hastings	10 "
Piermont	15 "
Dobbs' Ferry	15 "
Nyack	16 "
Tarrytown	17 "
Sing Sing	18 "
Croton Landing	19 "
Haverstraw	19 "
Verplanck's	20 "
Peekskill	20 "
West Point	21 "
Cold Spring	21 "
Newburgh	23 "
Poughkeepsie	22 "
Rondout	23 "
Boats of 100 Tons	Per Boat
To Manhattanville, and Return	$12 0
Spuyten Duvvil, "	14 0
Yonkers, "	15 0
Sing Sing, "	25 0
Peekskill, "	25 0

METALS.

IRON.—Duty: Bars, 1 to 1¼ cents ℔ lb; Railroad, 70 cents ℔ 100 lbs.; Boiler and Plate, 1½ cents ℔ lb; Sheet, Band, Hoop, and Scroll, 1¼ to 1¾ cents ℔ lb; Pig, 9 ℔ ton; Polished Sheet, 3 cents ℔ lb.

Pig, Scotch No. 1, ℔ ton	34 50	@37 00
Pig, American, No. 1	40 00	@41 00
Pig, American, No. 2	37 —	@38 —
Pig, American, Forge	35 —	@— —
Bar, Refined, English and American	85 —	@— —
Bar, Swedes, assorted sizes (gold)	82 50	@85 00
Store Prices.		
Bar, Swedes, ord'y sizes, less 5 ℔ ct.	— —	@140 —
Bar, Refined " "	95 —	@100 —
Bar, Common " "	87 50	@ 90 —
Scroll " "	120 —	@180 —
Ovals and half-round " "	120 —	@145 —
Band " "	120 —	@ — —
Horse Shoe " "	120 —	@ — —
Rods, ¼ to 3-16 inch " "	140 —	@155 —
Hoop " "	125 —	@180 —
Nail rod, less 5 ℔ ct.	— 8¼	@— 9¼
Sheet, Russia, as to Nos. (gold)	— 10¾	@—11½
Sheet, Single, D. and T. Common	— 5½	@— 7
Sheet, Galvanized List 15@25 ℔ cent. discount.		
Rails, English (gold), ℔ ton	56 50	@57 00
Rails, American, at Works in Pa.	76 00	@77 00

STEEL.—Duty: Bars and ingots, valued at 7 cents ℔ lb or under, 2½ cents; over 7 cents and not above 11, 3 cents ℔ lb; over 11 cents, 2½ cents ℔ lb, and 10 ℔ cent ad val. (Store prices.)

English Cast (2d and 1st quality) ℔ lb	— 18	@—	22
English Spring (2d and 1st quality)	— 9	@—	11½
English Blister (2d and 1st quality)	— 11½	@—	19
English Machinery	— 12½	@—	15
English German (2d and 1st quality)	— 14	@—	16
American Blister "Black Diamond"	— 10½	@—	16
American, Cast, Tool do.	— 19	@—	—
American, Spring, do.	— 10	@—	13
American Machinery, do.	— —	@—	13
American German, do.	— —	@—	13

COPPER.—Duty: Pig, Bar, and Ingot, 5 cents ℔ lb; Manufactured, 45 per cent. ad val. old Copper

	All Cash.		
Copper, New Sheathing, ℔ lb	—	@—	32
Copper Bolts	—	@—	33
Copper Braziers, 16oz. and over	33	@—	35
Copper Nails	38	@—	40
Copper, Old Sheathing, &c., clean	20	@—	21
Copper, Chili Pig	—	@—	—
Copper, American Ingot	22	@—	22
Yellow Metal, New Sheating	—	@—	27
Yellow Metal Bolts	—	@—	27
Yellow Metal Nails	—	@—	27

LEAD.—Duty: Pig, $2 ℔ 100 lbs.; old Lead, 1½ cents ℔ lb; Pipe and Sheet, 2¼ cents ℔ lb.

Galena, ℔ 100 lbs	$— —	@— —	
Spanish (gold)	6 35	@6 50	
German, do.	6 35	@6 55	
English, do.	6 35	@6 87½	
Bar (net)	8 50	@— —	
Pipe and Sheet (net)	8 50	@— —	

TIN.—Duty: Pig, Bars, and Blocks, 15 ℔ cent. ad val.; Plate and Sheets and Terne Plates, 25 ℔ cent. ad val.

	Gold	℔ lb.	
Banca	37	@—	
Straits	33¼	@—	
English	32	@—	

PLATES.

	Fair to Good Brands.	*Gold.*	*Currency.*
I. C. Charcoal, ℔ box	$8 12¼@8 37½	$11 00	@11 50
I. C. Coke	6 75 @7 37½	9 00	@10 25
Coke Terne	— — @6 00	— —	@ 8 50
Charcoal Terne	7 75 @8 25	10 50	@11 25

SPELTER.—Duty: In Pigs, Bars, and Plates, $1 50 ℔ 100 lb.

		Gold.	
Plates, Foreign	℔ 100 lbs. $6 —	@6 25	
Plates, Domestic	℔ lb. — 9	@— 12	

REMARKS.

IRON.—There is very little inquiry for either Scotch or American Pig, the business done since our last being confined to a few small parcels at previous quotations, viz., $34.50 @ $37 for Scotch; $40 @ $41 for No. 1, and $30 @ $32 for No. 2 American. There is an improved demand for new English Rails, and prices are a shade firmer; 4,000 tons sold at $56.50, gold. We quote American $76 @ $77, currency, at the works in Pennsylvania; 400 tons old Double-Headed sold on private terms.

TIN.—Straits remain firm at former quotations, 33½c., gold; English L and F 31½c. @ 31¼c.; Banca 36½c. @ 37c. Tin Plates are extremely dull, and without change in price.

COPPER—Quiet and without large transactions. We quote 22¼c. @ 22½c., cash, for all kinds.

SPELTER—Unchanged; 6¼c. for prime brands.

LEAD.—Demand light at 6¼c. @ 6½c. for ordinary Foreign.

ZINC.—American, dry, 8½c.; French, dry, 11½c.; French, metallic, 12c.

MANGANESE—5c. per lb.

Mining Stocks.

NEW YORK, Nov. 25, 1869.

Mining stock operations during the past week have assumed a livelier tone, and prices, especially for Colorados, have advanced. We note large sales of Grass Valley to-day at $25 @ $26; of Quartz Hil at $1.70 @ $1.80; of Smith & Parnelee at $1.75, and Gregory at $1.40.

In Petroleum stocks there is but little change to note since our last, while some stocks show a decline; Home at $7.90, New York and Alleghany at $1.30, and Union at $16, are instances of advanced prices.

The following are the latest quotations:

	Bid.	*Asked.*
Bennehoff	25	50
Clinton Oil	—	—
Brevoort	1 50	1 80
Buchanan Farm	—	85
Home Petroleum	—	7 90
Central	71	75
New York and Alleghany	1 30	—
National	—	—
United States	75	99
Northern Light	—	1 00
United Petroleum Farms	20	—
Rynd Farm	31	34
Pithole Creek	1 75	2 00
Bergen Coal and Oil	25	50
Second National	50	70
Rathbone Oil	20	—
Union	16 00	—

San Francisco Stock Market.

SAN FRANCISCO, November 22, 1869.

	1st Board.	*2d Board.*
Savage	67¾	64
Crown Point	15⅞	—
Yellow Jacket	53	49¾
Kentucky	1 54	1 50
Chollar Potosi	24⅛	23¾
Gould & Curry	79	—
Ophir	15⅞	16
Alpha	22	—
Belcher	18½	—
Imperial	50¾	—
Hale & Norcross	1 80	1 70

California and White Pine Stocks.

WHITE PINE.

	Bid.	*Asked.*
Aurora Consolidated	$— 16	$— —
Brodt	—	25c.
Chloride Consolidated	1	1½
Mammoth	1	1¼
Noonday	—	50
Original Hidden Treasure	—	11¼

CALIFORNIA.

Amador	285 00	300 00
Eureka	240 00	— —

IDAHO.

Golden Char't	15 00	20 00

The San Francisco *Commercial Herald* has the following notes on the mines: "Amador (Cal.) produced $54,000 in bullion during the month of October, against $49,542 in September. A dividend of $6 per share is payable since the 8th inst. Eureka (Cal.) disbursed a dividend of $7 50 per share on the 8th, aggregating $30,000.

"Rising Star (Idaho) levied an assessment of 50 cents per share on the 5th inst. Ida Ellmore shows a bullion return of $31,205 for the month of October. Dividend No. 3 of $1 is payable since the 10th.

"In White Pine stocks the business has been very fair at improved rates. Chloride Flat levied an assessment of $5 per share. Original Hidden Treasure will hold a stockholders' meeting on the 11th day of December, for the purpose of considering the increase of the capital stock from $1,600,000 to $2,133,300 dividend into $21,333 shares of $100 each. The ore breasts of the south shaft show a decided improvement in the bottom, while the north shaft is yielding the usual amount of high grade ore. The suit between this company and the Rathburn has been settled by consolidation; a new issue of stock to be had, and the Rathburn stockholders taken in—one to three. The Aurora Consolidated Company has excavated a chamber in the Earl, which runs northerly from the shaft 50 feet, is 30 high, and 30 wide, and south of the shaft the same chamber extends 50 feet, is 25 wide, and 10 in height—and still no country rock has been found, while the ore is very rich, and all the waste taken from this vast chamber would not fill a single wagon-bed. A dike-fissure of about the same proportions and characteristics has been developed in the Aurora Consolidated proper.

A Bureau of Mechanics.

MR. A. S. CAMERON, the well known inventor and manufacturer, has laid before us an interesting pamphlet on this subject. The following gives a synopsis of his views in regard to its organization and method of working:

"The head of this bureau, which I would call the 'Bureau of Mechanics,' should be selected for his mechanical and scientific attainments; he should rank as a Cabinet officer, taking part in the councils of the nation, and should make an annual report to Congress, on matters coming within his jurisdiction, suggesting such measures as he should find necessary for the promotion of industry, the protection of human life in transit, etc.

"This Bureau should be organized with schools similar to the Army and Navy, for the education of young men for civil pursuits, whose every step in the acquirement of useful knowledge, would be a golden treasure to the country, and who in return would be bound to serve the Government for a series of years, if required.

"The Bureau of Mechanics should supervise the general construction and management of railroads and steamships, with a view to the safety of human life in transit.

"It should hold communication with the the more intelligent mechanical organizations throughout the world, and be, in fact, a repository of mechanical knowledge, available for reference.

"When Congress is called upon to expend money on public works of any kind, this Bureau could furnish reliable information to direct its councils. Its officers could be employed in the inspection of mines, steamships, railroads, and public works, and in the investigation of disasters, with a view of preventing their recurrence.

"When Congress found it necessary to discuss the questions of tariff, this Bureau could furnish reliable information on the subject; showing the items that go towards making up the cost of commodities in every country in which we enter into competition.

"The effect of such a Bureau would be to give dignity and social status to the profession of mechanics, and to bring into our workshops young men who now object to the name of mechanic.

"It would hold in proper check large corporations, whose managers aim to make money regardless of the risk of human life, and entail upon them as a penalty for neglect of proper precaution, contributions for the benefit of sufferers, whose poverty now too often prevents them from asserting their injuries.

"The necessity of a Bureau of Mechanics in the economy of Government is suggested by the importance of manufactures and mechanics in the economy of life.

"Let our constant efforts be directed towards its establishment. Let us place the subject properly before the manufacturers and mechanics throughout the land, and through them before our representatives in Congress. Let it be thoroughly understood, that serious public interests, as well as the safety of human life, are dependent on the establishment of such a Bureau, and as we cannot look into a newspaper without seeing at least one argument in its favor, the existence of so important an arm of the public service will soon be a fixed fact."

MINING COMPANIES AND STOCK QUOTATIONS.

GOLD AND SILVER COMPANIES.	SITUATION OF MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED.
Alameda Silver		A. Queran, 108 Wall st	$2,000,000	$10 00		
Ada Elmore	South Boise, Idaho					
American Flag	Nevada District, Col	P. P. Fullerton, 71 B'way	600,000	10 00		
Atlantic and Pacific	Humboldt Co., Nevada					
Bates and Baxter	Colorado			50 00		
Benton	Colorado	W. F. Drake, 15 Broad	500,000	5 00	5	20
Briggs	Colorado	J. P. Davies, 19 Cliff	1,000,000	100 00		
Black Hawk	Colorado	C.T.Whittington, 48 Broad	2,500,000	100 00	25	1 00
Bobtail	Colorado	J. Stanton, Jr., 25 Nassau	1,000,000			
Bullion Consolid'ed Gold	Colorado					
Burroughs Gold	Colorado					
Church Union Gold	California					
Consolidated Gregory	Colorado				1 45	1 55
Combination Silver	Nevada			100 00	1 50	
Columbia Silver	Austin, Nevada	J. M. Brown, 155 B'way	5,000,000			
Commercial Silver		J. E. Smith, 26 Pine	3,000,000			
Corydon	Gilpin Co., Colorado	J. Samuels, 40 B'way	500,000			
Downieville	Colorado		2,500,000	25 00		
Eagle Gold	Gold Dirt Dist., Col	J. P. Davies, 19 Cliff	300,000	1 00		
Empire Gold and Silver	BodieBluff,MonoCo.Cal	H. K. Gates, 70 B'way	1,000,000			
Edgehill		A. Fullerton, 71 B'way	10,000,000			
Esperanza Silver		Ezra Clark, Jr., 13 William	400,000			
Fisk Gold		H. Johnson, 195 Fulton	500,000			
Forest Queen		E. B. Beet, 62 B'way	1,000,000			
Golconda Gold	Sherbrooke, C. E.	H. Adams, 71 Broadway	2,000,000			
Gregory	Colorado		1,250,000			
Gunnell Gold	Colorado	J. H. Rolston, 80 B'way	1,000,000	50 00		
Gunnell Central	Colorado	C. B. Bostwick, 16 B'way	3,000,000	10 00		
Gold Rock		R. M. Lockwood, 93 Wall	400,000			
Grass Valley					25	26
International Silver		J. W. Brazier, 26 Pine	600,000			
Hope Gold	Colorado		5,000,000			
Holman			2,000,000	25 00		
Kipp & Buell	Colorado		300,000			
Knickerbocker Gold		J. H. Rolston, 80 B'way	200,000	100 00		
La Crosse Gold	Nevada Dist., Col	P. P. Fullerton, 71 B'way	1,000,000		6	10
Lander Hill T. & S	Nevada	M.L.Catherwood,74 B'way	1,000,000			
Lewis Gold	Georgia		1,000,000			
Liberty Gold						
Manhattan Silver	Nevada	M. L. Ogden	400,000			
Maraposa common	California	Jas. H. Ferdon, 34 Wall	12,000,000		7⅝	8⅛
Mariposa preferred	California	do. do.			15¾	16¾
Montana Gold		G. De Cordova	400,000			
Montana M. L. & M. Co.	Montana	A. M. Hoyt, 22 William	250,000			
Montrose	Clear Creek Co., Cal	W. W. Perkins, 71 B'way	1,000,000			
New York Silver	Nevada	Thos. Sproull, 78 B'way	1,500,000			
New York and Austin	Nevada	E. R. Sieeomb, 70 Wall	500,000			
New York and Owyhee	Owyhee Co., Idaho		1,000,000			
New York and Eldorado		G. H. Munroe, 10 Wall	2,000,000			
N. Y. & Montana M. & D.	Montana	F. A. Chapman, 20 Nassau	1,250,000			
N. Y. & Silver Peach	Nevada	R. C. Root, 74 B'way	2,000,000			
N. Y. & Utah P. & M		W. H. Mailler, 108 Wall				
Ophir Gold	Comstock Lode, Nev	L. C. Warner, 70 B'way	625,000			
Owyhee Gold		W. H. Smith, 43 Ex. Place	1,700,000			
Pahranagat Central	Nevada	J. E. Smith, 25 Pine	6,000,000			
Quartz Hill Gold		F. Bernard	2,500,000		1 90	2 00
Reese River Consol'd	Nevada	W. B. Ogden	6,000,000			
Rocky Mountain	Colorado	S. M. Pond, 70 B'way	500,000	10 00		
Rollins Gold		Thos. Bond, 132 B'way	600,000			
Sensenderfer	Colorado	H. A. Shewill, 19 Broad	1,000,000			
Silver Bend		F. W. Macy, 20 Nassau	1,500,000			
Silver Mt. Silver		H. A. Moen, 71 B'way	1,000,000			
Silver Peak & R. M	Nevada	W. B. Ogden, 52 Wall	5,000,000			
Smith & Parmelee	Colorado	W. H. Hollister, 6 Broad	2,500,000	20 00	1 70	1 75
Social & Steptoe Con		T. H. O'Connor, 24 Nassau	450,000			
Standard Gold		C. B. Bostwick, 169 B'way	500,000			
Symonds Forks						
Twin River Silver	Nevada	J. F. R. Hadden, 20 Nassau	800,000	100 00		
Texas Gold	Colorado		500,000	10 00		
Union Gold	Colorado	F. A. Potts, 110 B'way	1,200,000			
Wash. Mill & Silver	Nevada	W. W. Perkins, 71 B'way	300,000			
Wauba Yuma	Arizona	J. W. Silsby, 36 Pine	6,000,000			

COAL AND IRON COMPANIES.	SITUATION OF MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED.
American Coal Co		M. A. Myers, 119 B'way	$1,500,000	$25 00		
Ashburton Coal Co		J. T. Rollins, 41 Pine	2,500,000			
Block House Coal		D. B. Keeler, Jr., 43 Pine	1,000,000			
Brewster Iron		H. Robison, 165 B'way	150,000			
Broad Top Coal & Iron Co	Pennsylvania	B. Love	2,000,000			
Cameron Coal Co		J. A. Simpson, 40 B'way	2,500,000			
Carbon Hill Coal Co		J. Silsby, 36 Pine	1,000,000			
Central Coal		F. P. White, 111 B'way	2,000,000	100 00		
Clifton Iron Co		P. H. Riordan, 34 Pine	1,250,000			
Columbia Iron		E. D. Webb, 77 Cedar	1,000,000			
Consolidation Coal	Maryland	J. S. Mackie, 71 B'way	5,000,000			
Crawford Coal		E. Clapp, Prest, 137 B'way	1,000,000			
Cumberland C. & I. Co		E. Kiscan, 90 B'way	5,000,000		27	27½
Derby Coal Co		W. S. Davison, 11 Broad				
Dover Coal and Iron Co		L. Chase, 88 Wall				
Del. & Hudson Canal Co			10,000,000	100 00		
Ebervale Coal		G.L.Stout, Treas.,111 Br'y	500,000			
Fall River Bituminous		D. T. Blauvelt, 43 Pine	1,000,000			
Farrar Coal		C. H. Jones, 43 Pine	250,000			
Fisher Iron Co		M. Ellis, 19 William	100,000			
Hamp're & Balt. Coal		S. M. Pond, 70 B'way	500,000			
Iron Cliffs Co		C. J. Canda, 52 Wall	1,000,000			
Jackson Iron		G. P. Loyd, 119 B'way	300,000			
Kemble Coal & I. Co		R. A. Wight, 26 Ex. Place	300,000			
Keokuk Coal		J. F. Franklin, 112 B'way	100,000			
Lackawanna I. & C	Pennsylvania	E. C. Lynde, 52 Wall	1,200,000			
Lewis Run C. & I. Co		C. A. Sanborn, 80 B'way	750,000			
Lykens Val. Coal Co		F. A. Platt, 13 William	800,000			
McKean Co. Bit. Coal Co.		J. H. Rolston, 80 B'way	1,500,000			
Lehigh & Susquehanna						
Mahanoy			400,000	100 00		
McNeal C. & I. Co		C. C. Godwin, 71 B'way	500,000			
Mount Riga Iron		G. M. Newton, 42 Cedar	300,000			
New Boston Coal		C. H. Ogden, 55 B'way	2,000,000			
N. Y. Con. C. & I. Co		A. T. Levine, 16 Wall				
N. Y. & Lehigh Coal		T. Simpson, 111 B'way	150,000			
Pacific Coal Co		G. Wrighton, 34 Wall				
Peekskill Iron Co		W. Murdock, 7 Nassau				
Pennsylvania Coal Co		C. H. Mead, 111 B'way	3,200,000	50 00		
Richmond Iron Co		C. H. Smith, 165 B'way	1,000,000			
Scotia Coal Co		I. N. Soper, 42 B'way	2,500,000			
Spring Mt. Coal		C. Runyon, 111 B'way	1,250,000			
Springfield & D'p Run C.		E. D. Webb, 77 Cedar	600,000			
Stout Coal Co		G. S. Comstock, 111 B'way	500,000			
Susquehanna & Wyoming		E. Potter, 40 B'way	1,000,000			
Tannerdale Coal		I. T. Ludlaw, 71 B'way	250,000			
Wash. Mutual Coal		M. C. Baker, 117 B'way	420,000			
West Point Iron Co		R. C. Brock, 110 B'way	500,000			
Wilkesbarre C. & I. Co		W. H. Tillinghast, 80 Br'y	3,400,000			
Wyoming Val. Coal Co		E. Potter, 40 B'way	1,000,000			

COPPER AND LEAD COMPANIES.	SITUATION OF MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED.
Anita Copper	California	J. A. Ferguson, 8 Wall				
Corinth Copper	Corinth, Vermont	S. H. Howard, 191 B'way	$500,000	25 00		
Davidson Copper						
Eagle Harbor Copper	Michigan	W. H. Smith, 43 Ex. Place	500,000	25 00		
Evergreen Bluff Copper	Michigan	F. W. Caper, 44 Ex. Place	500,000	25 00		
Globe Copper		R. K. Rickard, 19 Nassau	200,000			
Grand Portage Copper Co		A. S. Kellogg, 22 Pine	500,000			
Guymard Lead		Samuel Vernor, 38 Pine				
Hilton Copper		W. H. Smith, 43 Ex. Place	500,000			
Hope Copper		J. W. Davis, 19 Nassau	500,000			
Hudson River Copper	New York	T. Clarkson, 22 William	1,500,000			
Indiana Copper Co		J. M. Mills, 25 Nassau	500,000			
Isle Royale Copper	Michigan	F. W. Caper, 44 Ex. Place	1,000,000			
Keweenaw Copper	Michigan	F. W. Caper, 44 Ex. Place	500,000			
Lake Superi'r Silver Lead	Michigan	A. S. Kellogg, 22 Pine	1,000,000			
Omiga Copper	Michigan	S. Cooper, 7 Pine	500,000			
Ridge Copper	Michigan	J. L. Gardiner, Jr., 43 Ex. P.	500,000			
Rockland Copper	Michigan	A. Fullerton, 71 B'way	500,000			
St. Joseph Lead	Michigan	J. W. Jones, 6 Broad st	1,000,000			
St. Marguret Copper		E. P. Sutton, 43 Pine	250,000			
Schoolcraft Copper		R. Walsh, 22 William	500,000			
Superior Copper	Michigan	A. Fullerton, 71 B'way	500,000			
Union Copper		A. S. Kellogg, 22 Pine	500,000			
Vermont Copper	Vermont	J. C. Ely, 191 B'way	500,000			
Wallkill Lead		S. M. Pond, 70 B'way				

MISCELLANEOUS.	SITUATION OF MINE.	SECRETARY AND PLACE OF BUSINESS.	CAPITAL.	PAR VALUE.	OFF'R'D.	ASKED.
American Zinc Co		W. E. Lawton, 19 Cliff	$1,000,000			
Bigelow Blue Stone Co		H. Bogardus, 14 Pine				
Quicksilver					14¼	14½
Covill B. L. M. & M'f. Co		C. R. Bostwick, 302 Pearl	250,000			
Manhattan Marble		H. K. Gates, 70 B'way	300,000			
N. Jersey Zinc Co	New Jersey	A. B. Farlin, 61 Maiden L'e	1,500,000			

Sketch of the Geology of the State of Arkansas.

By Professor A. B. ROESSLER, Geologist of the United States General Land Office.

A GEOLOGICAL reconnoissance of Arkansas was made during the years 1857 to 1860 by Professor D. D. OWEN and his assistants, under the authority of the State, and much important information was collected relative to its principal geological features, and the extent of its mineral resources. The funds appropriated to the work, however, and the restriction as to time, did not admit of the definitive tracing out of the areas occupied by the several formations, and no map of the survey has been published.

The principal divisions of the State are covered by the Carboniferous, Subcarboniferous, and Tertiary formations. A small space on the north-eastern border reveals the presence of Silurian rocks; an equally small space in the south-west is occupied by the Cretaceous; and in two or three circumscribed localities the eruptive or hypogene rocks are developed at the surface. A brief notice of these in succession will afford a more satisfactory view of this interesting Southern State.

Commencing with a line at the eastern margin of the State, running along the valley occupied by the Mississippi and St. Francis rivers, and tracing another line from the north-eastern corner to the point where the Red River of Louisiana crosses the extreme south-eastern county of Lafayette, we shall have included between the two lines all the alluvial, the Quaternary, and Tertiary beds, and possibly a small amount of the Cretaceous formation in the centre of the State, near Little Rock, the capital. This vast triangular section includes about one-third of the territory of Arkansas, being the richest and most productive portion in an agricultural point of view. The great rivers of the State pass through it, bringing annually like the Nile, a great wealth of deposit from far distant western sources, which reach back to the base of the Rocky Mountains. The materials of these lands and river bottoms consist, in the north and north-eastern part of the triangle, of incoherent sands, loose and cemented gravel, and clays of recent geological date. As the detritus brought down by the river floods increases in the south-eastern portion, the lands become richer and more productive. As these rivers flow through districts abounding in saline, gypsiferous, and calcareous rocks, the mineral elements of these soils are annually recruited, and at the same time made easy of cultivation. It is a common thing to obtain from the same acres, year after year, a large yield of wheat, without any sensible diminution of productiveness.

The area occupied by the Cretaceous system has been variously represented on geological maps published from time to time. A more critical investigation of this formation in Arkansas was made by Professor OWEN, guided by such of its fossils as could be obtained; and it is now believed that it has been formerly represented as covering by far too much of the surface of the State. Instead, therefore, of representing it as a belt stretching from north-east to south-west, and lying inside (west) of the last or Tertiary division, we must limit it to a narrow area, extending from the Texan boundary, in the south-west corner of the State, up to the Ouachita river, near Arkadelphia, and principally occupying Sevier, Hempstead, and Clarke counties. It is characterized by the abundance of species of *Exogyra*, *Ostrea*, and other mollusks. It was from Hempstead county that the fossil bones of a *Zeuglodon* (a huge saurian) were exhumed, some twenty years ago, by Dr. KOCH. From all the bones he could collect (of many individuals) he prepared a restored skeleton, of 60 or 70 feet in length, and exhibited it throughout the United States, finally transporting it to Berlin, where it was sold. The skeleton and teeth of extinct species of sharks are also of common occurrence in the Cretaceous of Arkansas, Texas, and Kansas.

The Carboniferous formation covers a very large area of the State, being a southern extension of the coalfields of Missouri. It is not always, however, to be predicted from the presence of carboniferous shales and limestones that beds of coal are accessible; still this invaluable source of prosperity to a State is not by any means deficient in Arkansas. On the north-western boundary, and along two-thirds of the western margin, these rocks prevail. But the principal mines, and those which furnish the best coal, are located along the line of the Arkansas river, and on both sides of its basin. As far east also as White county, bordered by the river of that name, good seams of coal have been opened. The outline of the formation is irregular, and not distinctly made out. The best coal, and the most productive beds, are found on Spadra creek, in Johnson county, and are known to extend far back into the country in a northerly direction. Near the mouth of the creek the seam is about three and a half feet thick, from which must be deducted a few inches of clay seams, shale, and poor coal.

In the western counties, Franklin, Sebastian, and Crawford, valuable seams of coal have been discovered, from three to five feet thick; and it is asserted that coal exists in twelve counties of the State. From the abundance of timber which can be used for fuel, the value of coal is not as fully appreciated as it will be hereafter. At present the great demand is to supply the blacksmiths' forges.

The character of the coals of Arkansas is, for the most part, semi-bituminous, inclining to bituminous, no true anthracite, thus far, having been detected within the State. This might have been inferred from the absence of those eruptive rocks which, by metamorphic action, convert the one description into the other.

The coal beds of Arkansas hold a low position in the geological series. Their place is below the conglomerate and millstone grit, and above the *Archimedes* and *Pentremites* limestones, the latter belonging to the Subcarboniferous group, below which no coal need be looked for. It is usual, therefore, to designate such beds as sub-conglomerate coal.

The Subcarboniferous formation occupies the entire breadth of two tiers of counties, running parallel with the northern line of the State, reaching from the Big Black river on the east to the two last counties on the west, which latter may be regarded as belonging to the Carboniferous system. In an economical aspect, these rocks are highly valuable, being loaded with lead, zinc, and manganese deposits to an inexhaustible extent. The zinc ores are of so frequent occurrence that Arkansas may be said to surpass every State in the Union in this respect. The lead ores are remarkably free from foreign admixture, and not argentiferous. The proximity of the lead mines of Missouri somewhat depresses this branch of enterprise in Arkansas.

Immense stores of oxide of manganese also have been discovered, much of which is fully equal in quality to the demands of the manufacturing chemist for making bleaching salts, and other preparations of chlorine. It exists in two conditions, one of which, being hard and crystalline, is not so valuable as the more pulverulent and black ore, which yields ten per cent of oxygen, upon which the market valuation depends.

In the magnesian limestone there have been discovered numbers of nitre caves, containing deep beds of a porous earth, impregnated with saltpetre. These require merely lixiviation, and the addition of the ley of wood-ashes, whereby the salt is crystallized out of the mother liquor. These caves have been for countless ages the resort of wild animals, and not unfrequently have become their place of burial. The decomposition of their remains furnishes an important constituent of the nitre.

Intruded into, and underlying this formation from Missouri, is a small body of rocks of compact flinty character, but almost devoid of fossils. From analogy it has been concluded that these belong to the lower Silurian system. The dividing line of Fulton and Lawrence counties passes over them. A remarkable fountain, called the Mammoth Spring, rises through them and becomes the chief source of Spring river. Its opening is large and cavernous, being about forty yards in diameter, and yielding the enormous quantity of eight thousand barrels of water per minute—enough to drive twelve or fifteen runs of millstones. Its location is in Fulton county, close te the Missouri line. The temperature of the water seldom falls below 60° in winter or summer.

At the base of the Carboniferous system lies a group of rocks known as the conglomerates or millstone grits. In many parts of the United States they are of only moderate thickness, but they always characteristically mark the line below which workable beds of coal, especially in the eastern mines, are not to be expected. In Arkansas these rocks are immensely expanded, exceedingly diverse in character, and spread over an unusually large superficial area. They occupy that portion of the State which lies east and south of Arkansas river and west of Little Rock, and, associated with them, enclosed within thin strata, are found the only valuable beds of coal as yet discovered in the State. They comprise an immense assemblage of sandstones, slates, shales and limestones, and may certainly be regarded as the leading formation of the State. Fossils are not abundant in this group, and some hesitation is still felt by geologists in assigning to it its true geological horizon. The occurrence in it, however, of *Productus*, *Pentremites*, and the singular *Bryozoon* fossils, the *Archimedes*, nearly settles the question.

In two or three places the eruptive rocks make their appearance through this formation. One locality is at Little Rock; another at Magnet Cave; and there are others, reaching as far as old Fort Ouachita, beyond the western boundary. Further explorations may discover them along this whole line of upheaval.

The area occupied by the granites, syenites, porphyries, basalt and other igneous rocks in the places referred to, is quite small, being limited to less than five miles in diameter; and so far no other geological disturbances of the strata have been detected in the Siate. Along the line of upheaval have been discovered at intervals mineral veins, containing zinc, copper, galena and other valuable ores. Of these the most valuable is the galena, which has been proven to be highly argentiferous, yielding over fifty ounces of silver to the ton of lead, and thus affording the greatest encouragement to the skillful and persevering miner.

The eruptive forces which elevated the Appalachian chain seem to have become enfeebled in this portion of the United States, since there is no evidence at the surface of rocks of this character, with the exception of the few points referred to. But abundant evidence of subterranean activity is found in the northern and western portions of the State, where the unbroken masses are thrown up into mountains of over a thousand feet in height, and vast stretches of country, in billow-like undulations, but with unbroken strata, are frequent. The hot springs of the Ouachita must also be regarded as evidence of subterranean heat in activity; since for countless centuries there have been pouring out from the openings in the shales of this millstone grit, some hundred or more springs of water, ranging in temperature between 105° and 150° Fahrenheit. These are situated at the base of a ridge overlooking Hot Spring creek, from the bottom of which hot springs also rise, keeping the temperature of the whole body of the water so high that it is equally fitted for bathing purposes in winter as in summer. These waters eventually find their way to the Ouachita river. No crystalline or igneous rocks are seen here, and the ridge is capped with that remarkable mineral, novaculite, a close-grained and beautifully white siliceous rock, derived by metamorphic action from a fine sandstone of the millstone grit series.

These springs are resorted to annually by great numbers of invalids and others, who use the water for bathing and even for drinking, its stimulating character preventing the nauseating effect which might otherwise be expected. The medicinal virtues of the baths are of the highest value, though the benefits experienced in long-standing chronic disease must be attributed more to the exalted temperature than to any other agency. They excel other warm springs in the United States by nearly 50° of temperature.

No gold deposits in paying quantity have as yet been discovered. The useful materials, granite, slate for roofing, black and variegated marble, are abundant. The porcelain and pipe-clay, lignites, alum-shales, oil-stone, hydraulic limestone and various other mineral products are sufficient in quantity for any demand which is likely to arise in the State.

American Institute.

JUDGES' REPORT ON DEPARTMENT 5, GROUP 2—PUMPS.

THE lists of awards published in the daily papers being exceedingly incorrect, we here give a transcript from the records of the Institute, thus placing our readers in possession of correct information in regard to the matter of pumps. It is but fair to add, that at the previous exhibition a very careful, elaborate, and practical investigation was made—the pumps having been carefully tested by actual trial. At that contest, the pump of Mr. C. B. HARDICK was declared the best. This year there was no trial or practical test.

566. Knowles & Sibley, Warren, Mass.—For best direct-acting steam pump, first medal and diploma.

729. C. B. Hardick, Brooklyn, N. Y.—For direct-acting Niagara steam pump, third medal and diploma.

755. George F. Blake & Co., Boston, Mass.—For a direct-acting steam pump, second medal and diploma.

729. C. B. Hardick, Brooklyn, N. Y.—For best steam crank pump, first medal and diploma.

950. Woodward Steam Pump Manufacturing Company, Nos. 76 and 80 Centre street, New York—For steam crank pump, second medal and diploma.

179. Bridgeport Manufacturing Company, No. 55 Chambers street, New York—For a factory pump, second medal and diploma.

474. T. F. Rowland, Greenpoint, L. I.—For best rotary pump, first medal and diploma.

134. J. H. A. Gerrick, Jersey City, N. J.—For a turbinate force pump, first medal and diploma.

532. W. D. Andrews & Bro., New York City—For best anti-friction centrifugal pump, first medal and diploma.

564. H. C. Dart & Co., New York City—For displacement rotary pump, second medal and diploma.

523. J. W. Cole, New York City—For best vertical feed pump, second medal and diploma.

179. Bridgeport Manufacturing Company, Bridgeport, Conn.—For best force, ship and well pump, second medal and diploma.

485. W. S. Carr & Co., New York City—For best house pump, second medal and diploma.

179. Mr. Charles Mudge, New York City—For best sink pump, second medal and diploma.

332. Julius Sherore, New York City—For a portable garden force-pump, second medal and diploma.

658. Emery Rotary Machine Company, New York City—For rotary hand pump, second medal and diploma.

1,206. William Sellers & Co., Philadelphia, Pa.—For best injector, first medal and diploma.

923–24. J. B. Gruber, New York City—For best water-works for dwellings, first medal and diploma.

586. F. W. Mahler, New York City—For a turbine water-wheel, second medal and diploma.

175. Broughton & Moore, New York City—For best positive feed-oil cup, second medal and diploma.

674. Nathan & Dreyfus, New York City—For best automatic oil-cup, second medal and diploma.

1,142. C. Merril & Sons, New York City—For a very superior and efficient fan-blower, first medal and diploma.

418. P. Clark, Rahway, N. J.—For multiple fan-blower, first medal and diploma.

804. S. S. Townsend, New York City—For best pressure blower, first medal and diploma.

554. Cole Brothers, Pawtucket, R. I.—For steam fire-engine, first medal and diploma.

A New Use for Mica.

AT a recent meeting of the Industrial Society of Nuremberg, attention was drawn to a new use for mica, the mica being that from the Siberian localities, which furnish it in such fine plates. When the thin plates are cleaned with concentrated sulphuric acid, and silvered in the same manner as glass, they take a lustre similar to that of silver, and being pliable, they can be employed in the covering of various ornaments. By coating the thin plates, and afterwards exposing them for a very short time in a muffle heated to bright redness, an aspect of matted silver is given. It is necessary to avoid heating the mica too long or too powerfully, since in either case a silvery shade is communicated, as well as great brittleness. The silvery substance formed is distinguished from metals by the property of resisting nearly all reagents. It is not in the least affected by sulphuretted hydrogen, by the sun, water, air, concentrated acids and alkalies.

The Chesapeake and Ohio Canal.

IN 1842, when the Chesapeake and Ohio Canal was first opened, only 1,700 tons of coal were mined at Cumberland, Md. At the close of business last year over 1,300,000 tons were shipped, and the trade this year, at the same period, will have reached from 1,600,000 to 1,800,000. The fifth day of December, the day determined upon for drawing off the water, is from ten to fifteen days earlier than usual; but as the order has been issued it may not be revoked. The regulations about observing the Sabbath, it is thought, will reduce the receipts of the canal company from $35,000 to $40,000 annually. Several of the companies will quit shipping during the present week, and have their boats tied up till spring.—*Cumberland Civilian, Nov. 25.*

THE ENGINEERING AND MINING JOURNAL.

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ROSSITER W. RAYMOND, Ph. D., Editor,

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The Suez Canal.

THE reported successful inauguration of this great enterprise lends additional interest to an elaborate article in the *North American Review* for October, entitled "The Coast of Egypt and the Suez Canal," and written by Mr. HENRY MITCHELL, Chief of Physical Hydrography, United States Coast Survey. This essay commences with a very satisfactory discussion of the nature of the coast of Egypt.

Lower Egypt, "the gift of the Nile," has been regarded by most authorities, ancient and modern, as a territory reclaimed from a gulf or arm of the Mediterranean, and not as a deposit superimposed upon the sands of the desert. BEAUMONT regards the sandy border of Egypt as a formation antecedent to the river delta, a littoral sandy cordon, formed by marine waves and currents, like that of Greytown, in Central America, or our own Sandy Hook. This cordon he supposes to have separated from the Mediterranean a gulf or lagoon, within the shelter of which the Nile has made a homogeneous deposit of mud. Mr. MITCHELL, on the contrary, finds it difficult to conceive of any external forces which could have formed a convex coast like that of the Nile delta, and falls back upon the primitive notion, that a bank of mud has projected itself into the sea.

This view is met by an objection based upon the absence of sands upon the delta, to explain which, the hypothesis of a pre-existing sheltered bay has been resorted to. But Mr. MITCHELL replies, that such sands do exist in great abundance, proving that the Nile deposits rest upon a marine bed. His hypothesis, that the convex shore is a creation of the Nile, leads him to believe that it must have advanced in successive concentric zones, and that the powerful current of the river must have chosen for itself at different periods, different radial routes to the sea. In his own words, "the coast-line, while slowly advancing upon the sea, must, in its general sweep, have oscillated about the arc of a circle, of which the centre was somewhere in the main artery of the great floods." Having determined from the physical features of the coast and delta the probable position of this centre, he was surprised to find that it coincided with that of the Pyramids of Gizeh. "The Great Pyramid," remarks Mr. MITCHELL, "situated upon the last rock that confines the floods of the Nile, occupies a more important physical position than any other artificial object upon the face of the earth, since it is the centre from which radiated the waters of the river, and from which, from age to age, the coast may be supposed to have advanced in concentric arcs. With no predisposition to believe in the scientific purposes of the pyramid-builders, I nevertheless cannot help thinking that, if there ever existed a comprehensive and economical system of irrigation in Lower Egypt, this initial point must have been to the engineer one of primary importance." This suggestion is quite as sensible as many that have been advanced concerning the uses of the Great Pyramid; but we should think the aforesaid "last rock," affording a suitable foundation for so vast a structure, would be as likely to determine the location, in the mind of the architect, as any considerations influencing the engineer.

The question whether the sands of the Egyptian coast are brought down by the Nile, or thrown up by the sea, is one of great practical importance to the Suez Canal. The problem of the actual construction of that work has been successfully solved. There now remain two great and doubtful questions, influencing its future usefulness. One relates to the preservation of the artificial harbor at Port Saïd, the other to the navigability by sailing vessels of the Red Sea; and the first of these is directly affected by the origin and extent of the shifting sand deposits. The fact, established by Mr. MITCHELL, that these deposits are brought by the Nile, is favorable to the maintenance of the harbor, though this will remain in any case a work of difficulty and expense.

The harbor of Port Saïd is altogether artificial, consisting of two basins, one within, and the other without, the natural shore-line; the former protected by moles, the latter excavated in the sandy border of Lake Menzaleh. The western mole of the outer port is by far the longer and more important. It is now about a mile and a half long, and will be extended to two miles. Its general direction is northeast; and it serves to protect the basin from the sands brought down by the Nile (on the eastern corner of the delta of which Port Saïd is situated) and shifted along the coast by the strong easterly current of the Mediterranean, as well as from west and northwest winds. The eastern mole is straight, and about one mile long, running nearly north. From northeast winds there is no protection. Even the entrance to the river basin is exposed to them. Mr. MITCHELL remarks, however, that this outer basin is very rarely rendered even uncomfortable by storms.

The harbor is threatened ultimately by the accumulations of sand which are going on outside of the great windward or western mole. These have already caused the coast to advance, in eight years, over an area of 378,000 square yards, representing a filling of 622,000 cubic yards. It is probable that this shore will advance till it reaches the end of the mole, and that the sands will then sweep into or across the anchorage. Mr. MITCHELL thinks this may take place in about forty years. Before that time, however, the Suez Canal will have proved, either an unprofitable enterprise on other grounds, or so useful and remunerative as to justify any necessary expense for enlarging and protecting this basin.

More immediate and serious damage arises from the *racing* of the sea and coast currents around the extremity of the mole, and the consequent deposit of sand under the lee of the latter. And the greatest trouble of all has been caused by the driving of sands through the interstices of the mole itself. These sands have actually destroyed the larger part of the channel first dredged out under the lee of the mole, and necessitated the abandonment of a portion of the basin. The evil is due to the manner in which the moles of Port Saïd were built. They are mostly "*rip-rap*" breakwaters of rectangular blocks of *béton*, or artificial stone, composed of sand dredged from the harbor, mixed with lime from Theil, in the proportion of two to one, dried for three months, and then tumbled into the sea. In rip-rap constructions, precautions are usually taken to prevent the occurrence of large interstices, through which fine sand would be borne with each dash of the sea. The Suez Canal Company, being in a hurry to enclose an anchorage, neglected these precautions, and is suffering some inconvenience in consequence. We anticipate, however, that the extension and packing of the sand along the windward side of the mole will put an end to this trouble; and we do not quite agree with Mr. MITCHELL, who fears that this protection would not in all cases be adequate, without a revetment of rubble work or fascines.

The area comprised between the two moles is four hundred acres, which, "when properly excavated, will accommodate twenty ships of the line, swinging freely at their anchors, or four hundred first-class merchant ships, moored stem and stern." The passage into the inner harbor or "Grand Basin of the Port" is six hundred and fifty feet wide; and the basin is of ample dimensions. Whatever may be the imperfections of the works of Port Saïd, they will answer well enough to prove the value of the great enterprise of which they form a part.

The canal itself is eighty-seven and a half nautical miles in length, with an average width exceeding three hundred feet, and a minimum depth of twenty-six feet below the mean level of the sea. It terminates in the magnificent harbor of Suez, of which Mr. MITCHELL remarks: "The Suez roadstead furnishes some land-locked anchorage berths, although the shelter to the southeast is distant and low. The holding-ground is perfect—a light brown clay. The Egyptian Government has constructed dry-docks at the head of the roads after the most approved plans, and every facility for repairing and refitting ships will be found there and in the neighborhood. In spite of the absence of vegetation, the scenery about the roadstead of Suez is very beautiful and grand. The sea has the rich blue of the Bay of Naples, and the purple crags of Ghebel Attaka rise nearly three thousand feet upon the African shore."

Unfortunately this lovely harbor lies at the head of the unlovely Red Sea, to the characteristics of which we shall give attention in another article.

The Cardiff Giant.

THE public mind has been considerably agitated of late over the discovery on the 16th of October, in the Valley of Onondaga creek, in this State, of a colossal statue of gypsum, representing a man asleep. The theories of its origin are numerous enough. Some have considered it a petrified giant; and cited in support of that view the authenticated cases of petrifaction of human bodies, flesh, bones and all. But these are all cases of silification; and the change of a human body in that way to sulphate of lime would be a very different matter. The microscope would settle that question, if it were not apparently settled already by the observation of PALMER, the sculptor, who says he finds upon the statue the traces of sculptors' tools.

Accepting the statue as the work of human hands, the next question regards the degree of its antiquity. The experts who have examined it have been rather non-committal in their opinions. Professor HALL, the State geologist, says but one thing positively, and that is that there is no gypsum in the State exactly like that of which it is composed. Dr. BOYNTON, the lecturer, says—a good many things, not all consistent with one another. His last discovery is that gypsum wears away rapidly under a stream of water, ergo, the statue, which is but little worn, cannot be so very old, after all. Dr. BOYNTON'S experiment hardly seems to us to justify this conclusion; but he hints in addition that he has some clue to the "humbug," which he will soon be able to unravel. In that case, his scientific tests may become at once trustworthy and superfluous.

Mr. PALMER professes that the marks which he has discovered are those of the tools of modern sculptors, so that he cannot give to the work a greater antiquity than two or two and a half centuries. This evidence would be conclusive, if the tools of modern sculptors were not, to the vulgar eye, so exactly like the tools of ancient sculptors. What is the difference that makes itself so plain to the eyes of an expert?

Dr. WOOLWORTH, of Albany, in a recent lecture on the subject before the Long Island Historical Society, declared, after discussing all the hypotheses advanced, that he had "no theory in regard to it, as to the manner in which it was made, by whom it was made, or for what it was made." All he had to say was that "as it lies there it is a great wonder," and he had "no great confidence that the true history will be discovered or disclosed, and yet it may be." This view, which in a manner reconciles all the conflicting theories, was appropriately received with "loud applause."

Finally, and perhaps just a little too late, the *Circular* of the Oneida Community presents an elaborate legendary argument, referring the statue to the eleventh century, and the Northmen, whom it identifies with the "stonish giants" of the Iroquois. One of the present Onondaga Indians is said to have declared that his great-grandfather, while hunting one day in the depths of the forest, saw one of the stonish giants leaning against a tree, and instantly fled for his life. This great-grandfather lived to be one hundred and sixty years old, and bequeathed the tale to the narrator's father, who, dying prematurely at one hundred and eight years, left it to his heirs.

Finally, along comes a smart newspaper correspondent, who declares that the statue is not even stone, but iron, coated with cement, and hollow. He says it weighs too much for gypsum. But twenty-one cubic feet of gypsum (which must be about the bulk of this statue) will weigh about twenty-nine hundred pounds, which is the weight of the giant; while, on the other hand, the weight of a *hollow* iron casting is a variable affair. Iron being only a little more than three times as heavy as gypsum, the hollow statue would have to be one-third solid iron, in which case it would scarcely "sound hollow," as this writer fancies.

Three-quarters of the giant have been sold for thirty thousand dollars; and the discussion concerning it will doubtless now be protracted indefinitely, as it is somebody's interest to keep the question afloat. Certainly this has been thus far very successfully accomplished. The profound opinion of Dr. WOOLWORTH is the only one which stands firm; and to that we anchor ourselves for the present.

The Stetefeldt Furnace.

WE are glad to learn from trustworthy sources that the furnace erected by Mr. CHARLES A. STETEFELDT, at Reno, Nevada, for the chloridizing roasting of refractory silver ores, has been put in operation with most satisfactory results. MR. STETEFELDT built an experimental furnace on this plan, at the works of the Twin River Company, some two years ago; and the unanimous opinion of the witnesses of that trial was in favor of the new invention, as far less expensive, and at the same time not less thorough, than the old method of roasting in reverberatories. But the company had a number of nearly new reverberatories running at that time; the STETEFELDT experimental furnace was outside of the mill, and could not easily be made a part of the general system of working; the expense of tearing down existing furnaces and erecting new ones, involving as it did a stoppage of the mill, was considered too great; and for these reasons, the adoption of Mr. STETEFELDT'S process was postponed.

It was, however, a part of the plan of the management of the Twin River Company, when the mill was stopped for want of a regular and adequate supply of ore, to substitute this furnace for their reverberatories, in order to be able, when the mine should be sufficiently opened, to run at full capacity and greatly reduced cost of metallurgical treatment. The unfortunate and unnecessary bankruptcy of the company intervened; and the STETEFELDT furnace was not erected as a part of the regular works. The new company, which has succeeded to the possession of this magnificent property, will doubtless carry out the plan, and reap the reward.

Meanwhile, it has been for a year or two almost impossible to make capitalists believe that this furnace has any merit. Every knowing ignoramus would shake his head, and ask significantly why the people who tried it first did not at once adopt it; and thus it came to pass, that the very experiments which established its incontestible value in the eyes of experts, almost ruined it in the estimation of the public.

The GERSTENHOFER terrace furnace has had a similar fate, in spite of the steady favorable reports of its working results in hundreds of instances, on the other side of the Atlantic. One furnace of this sort was built in Colorado, and experimentally run, with satisfactory results. But LYON'S works were shut up; and no GERSTENHOFER furnace has been run since that day in this country. We hear, however, of some promising activity in that direction; but at all events we congratulate Mr. STETEFELDT on having found capitalists of intelligence and courage to adopt his furnace, and enable him to repeat the proofs of merit which were furnished by its former trial. We shall soon give further particulars of its success.

Composite Ships.

THE following is an extract from a letter of the New York *Times* correspondent respecting shipbuilding on the Clyde and the Tyne :

"The composite clippers, which are in such high favor with the London merchants in the China trade, are built of iron and wood. The frames are of iron, and the outside planking is of wood, which is screwed on the iron framing with composition screw bolts. Great care is taken to give the skeleton of the ship great strength, by means of fore and aft keelsons and stringers and disgonal iron braces, it being the rule with the best builders of composite ships to build them as strong, minus the outside plating, as a complete iron ship, plating included. The oak planking then becomes simply a covering to keep the water out. It is claimed for the composite ships that they sail faster, especially on the return voyage from China, when high speed is in most request, and when the increasing foulness of an iron ship's bottom is apt to reduce the speed of a ship plated with iron. The use of the composite ship is almost exclusively confined to the tea trade, and it is not likely that this system of building will be as extensively practiced a few years hence as it is at the present day. If the Suez Canal is a success, steam will entirely supersede sails in both the China and India trade, and for steam-propelled vessels iron is preferred. The cost of a composite ship, including her metal sheathing over the wood bottom, is about £2 per ton higher than the price of an iron-plated ship. Messrs. CONNELL & Co., who have also acquired a high reputation for building fast clippers, are at present building three composite ships for the China trade. One of them is a very beautiful craft, of the same model as the famous *Spindrift*, the winner of the last clipper race home from China. The dimensions of the new ship are, length, one hundred and ninety feet ; beam, thirty-two, and twenty-five feet hold. It will be noted that the length is greater in proportion to the beam than is usual in the United States, though in this instance the disparity is not carried to the extreme limits which are fast coming into favor among British ship owners. Steamships of ten and even twelve times their breadth of beam, are now coming into use, and many that are running are doing remarkably well in speed, and carrying very large cargoes on moderate running expenses. Great length certainly gives a builder the opportunity of combining a long full section for stowage with good ends for the easy passage of his vessel through the water ; and if the hull can be made sufficiently strong, and the vessel behaves well at sea, there would seem to be no reason why the long, narrow model should not be generally adopted. Several Liverpool steamers have certainly been improved in seaworthy qualities, as well as in capacity and speed, without any increase of power, by cutting them in two in the widest part, and putting in forty or fifty feet of additional length."

Cotton in India.

THE Cotton Commissioner for the Central Provinces of India and the Berars, in writing to the Bombay Chamber of Commerce on the 21st of last month from Nangpore, states that on the whole the prospects of the cotton crop in that district are favorable. The season, he says, has been a trying one, but the rain has always fallen when it was most wanted, and cultivators are in good spirits, and predict a good season. In the country above the hills to the south of Khangaon and Oomarstee, the rainfall has been abundant, and the cotton crop is reported to be forward.

The Diameter of Trees.

IN a paper addressed to the Academy of Toulouse, M. Musset states that all the large healthy trees of the woods of Ville-d'Avray and St. Cloud are, in the immense majority of cases, thicker in the direction from east to west than in the contrary one. The same circumstance has been noticed elsewhere by other observers.—*Ex.*

COLONEL DRAKE, the first man who "struck oil" in Titusville, Pa., recently died in a poorhouse in Connecticut.

MISCELLANEOUS.

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MISCELLANEOUS.

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VOLUME VIII. COMMENCED JULY 6.

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MINING is a subject that receives equal attention with Engineering. The various interests involved in the mining operations of the country, as

THE COAL TRADE,
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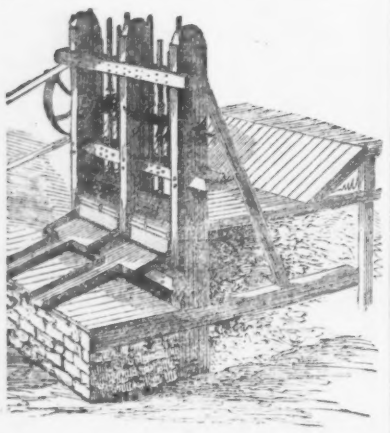

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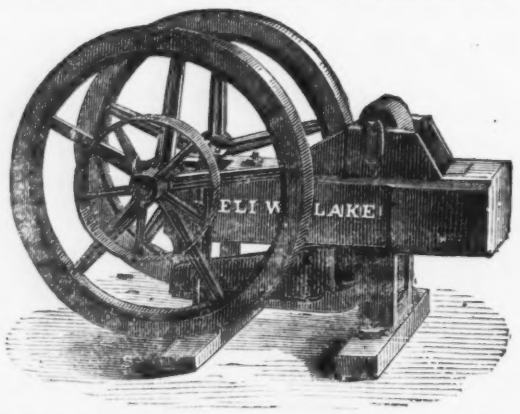

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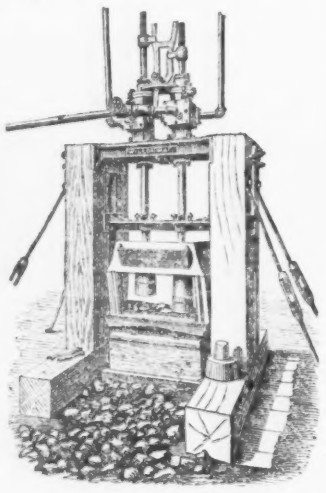

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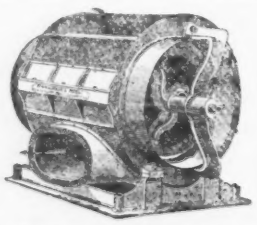

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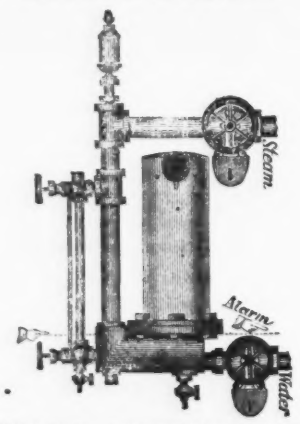

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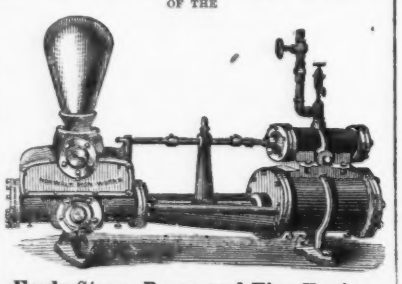

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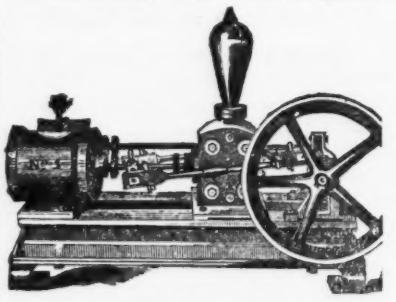

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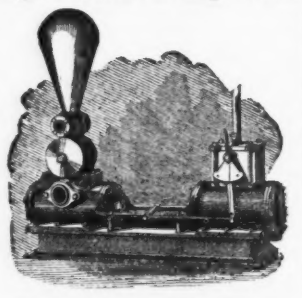

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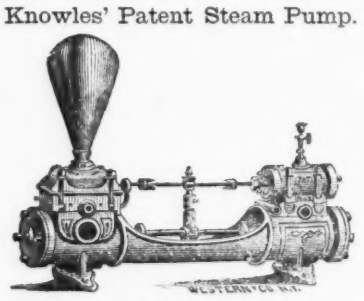

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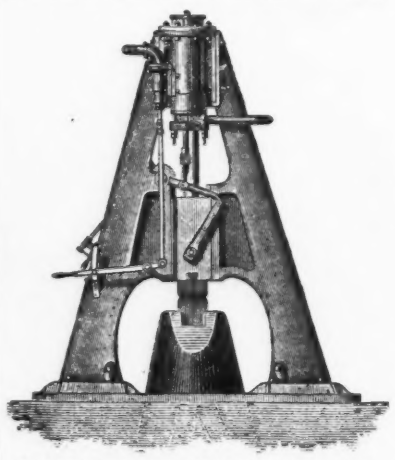

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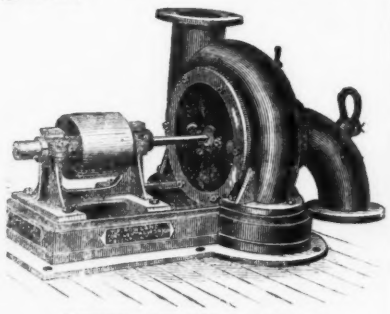

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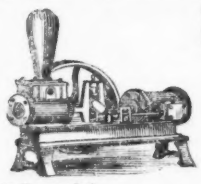

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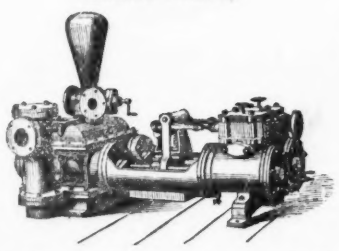

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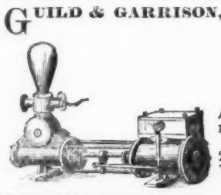

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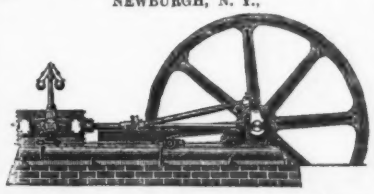

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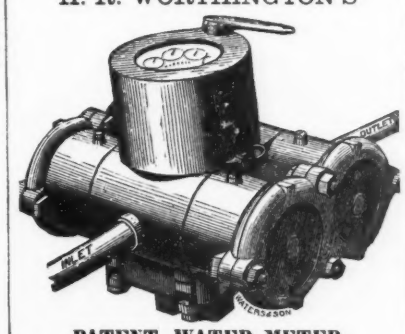

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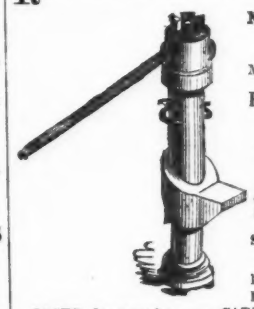

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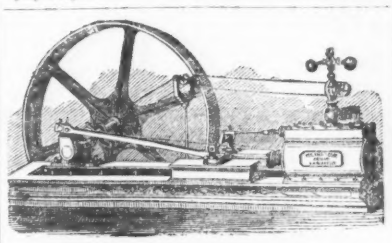

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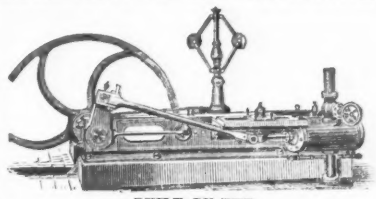

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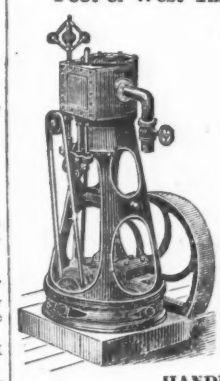

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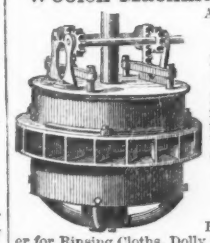

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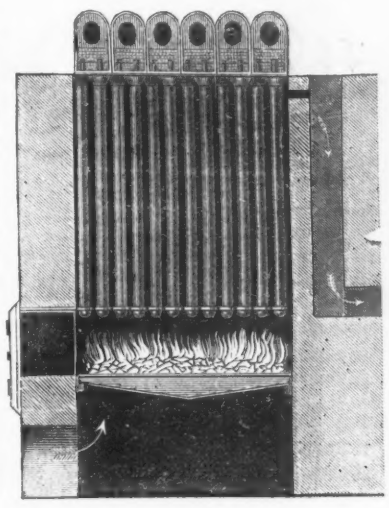

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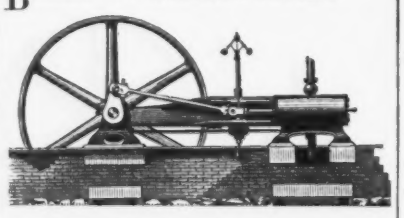

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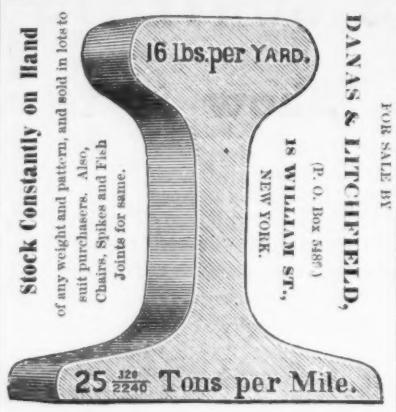

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